

# California High-Speed Train Project



## TECHNICAL MEMORANDUM

### Design Terms, Abbreviations, and Acronyms TM 0.0a

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## System Level Technical and Integration Reviews

The purpose of the review is to ensure:

- Technical consistency and appropriateness
- Check for integration issues and conflicts

System level reviews are required for all technical memoranda. Technical Leads for each subsystem are responsible for completing the reviews in a timely manner and identifying appropriate senior staff to perform the review. Exemption to the system level technical and integration review by any subsystem must be approved by the Engineering Manager.

System Level Technical Reviews by Subsystem:

Systems:	<u>Signed document on file</u> Rick Schmedes	<u>10 January 12</u> Date
Infrastructure:	<u>Signed document on file</u> John Chirco, PE	<u>21 October 11</u> Date
Operations:	<u>Signed document on file</u> Joseph Metzler	<u>12 December 11</u> Date
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## **ABSTRACT**

This technical memorandum establishes summary of common, relevant terms, abbreviations, and acronyms that are anticipated to be used in the preparation of design documents for the California High-Speed Train Project (CHSTP). It is intended to promote the consistent use of project nomenclature in the development of CHSTP design documents. The terms and acronyms listed in this technical memorandum have been compiled from the CHSTP technical memoranda prepared to date and from input from preparers of Systems technical memoranda.

Periodic updates to this document are anticipated and updates will be incorporated into revision of this TM 0.0a.



## **1.0 INTRODUCTION**

### **1.1 PURPOSE OF THE TECHNICAL MEMORANDUM**

This technical memorandum establishes summary of common, relevant terms, abbreviations, and acronyms that are anticipated to be used in the preparation of design documents for the California High-Speed Train Project (CHSTP). It is intended to promote the consistent use of project nomenclature in the development of CHSTP design documents. The terms and acronyms listed in this technical memorandum have been compiled from the CHSTP technical memoranda prepared to date and from input from preparers of Systems technical memoranda.

Periodic updates to this document are anticipated and updates will be incorporated into TM 0.0a revisions.

## **2.0 DEFINITION OF TECHNICAL TOPIC**

As development of the CHSTP advances, new terms, abbreviations, and acronyms may be identified by different technical areas where there are several or differing meanings for the same term or acronym. Since design teams are working concurrently on multiple segments of the CHSTP, consistent use of terms and acronyms will promote quality for project deliverables, improve coordination among the design teams, and assist the review of project deliverables.

## **3.0 ASSESSMENT/ANALYSIS**

Not used

## **4.0 SUMMARY AND RECOMMENDATIONS**

It is recommended that consistent nomenclature be issued for use by the CHSTP team in order to promote consistency in the development and review of design documents. It is also recommended that the Design Terms, Abbreviations, and Acronyms be maintained, updated as new terms and acronyms are identified, and made available for use by the project team.

A glossary comprising a list of design terms, definitions, and acronyms is presented in Section 6.0.



## 5.0 SOURCE INFORMATION AND REFERENCES

Terms, Abbreviations, and Acronyms listed herein are based on the CHSTP documents developed to date.

Additional definitions and acronyms information were or may be obtained from other sources, including the following.

Caltrans Project Development Procedures Manual, Chapter 1, Section 3, – December 15, 2007

The Manual for Railway Engineering of the American Railway Engineering and Maintenance-of-Way Association (AREMA Manual)

California High-Speed Rail Program – Statewide Program Environmental Reports EIR/EIS

European Technical Specification for Interoperability Relating to Infrastructure Subsystem of the Trans-European High-Speed Rail System

<http://www.apta.com/resources/statistics/Pages/glossary.aspx>

<http://www.dot.ca.gov/ser/glossary.htm>



## 6.0 DESIGN CRITERIA MANUAL

### 6.1 DESIGN TERMS, ABBREVIATIONS, AND ACRONYMS

The Program Management Team (PMT) has issued the Design Terms, Abbreviations, and Acronyms technical memorandum for use in preparing technical documents supporting the CHSTP. Document authors are responsible for preparing design documents in accordance with the information included in this document.

#### 6.1.1 Design Terms

The terms listed in this technical memorandum are the combination of terms used by Caltrans, the CHSTP PMT and terminology included in the CHSTP program level Environmental Impact Report/Statement. The glossary is a living document and requires regular updates.

2x25 kV Autotransformer System: A Power Supply scheme for electrified railways that utilizes a Catenary energized at 25 kV to ground and an along track Negative Feeder also energized at 25kV to ground. The 25 kV catenary and 25 kV negative feeder supplies are derived via connections to an Autotransformer or the secondary winding of a Main Transformer, which results in a phase difference of 180° between the voltages, giving 50 kV between the high voltage bushings.

A

Abandoned Mines: A collective term referring to the mapped or otherwise known presence of subsurface voids resulting from man-made mining or other subsurface tunneling activities.

Absolute Block: A section of track into which a train is not permitted to enter while it is occupied by another train, except as provided for by the rules.

Access Control: Restriction of access to or from a highway or railway right-of-way or facilities.

Access Control System: System which enables the Authority to control access to areas and resources in a physical facility or area.

Accessible Voltage: That part of the Rail Potential under operating conditions which can be bridged by persons, the conductive path being conventionally from hand to both feet through the body, or from hand to hand (horizontal distance of one meter to a touchable point).

Accessibility: The ease with which a site or facility may be reached by passengers and others necessary to the facility's intended function. Also, the extent to which a facility is usable by persons with disabilities, including wheelchair users.

Active Fault: A fault that has either known or is suspected of having had tectonic movement within Holocene time (past 11,000 years).

Administrative Telephone (ATEL): Telephones which provide fixed voice communications between Authority employees to conduct daily operations. Part of the Telephone and Intercom System (TIS).

Aerial Ground Wire: See Static Wire.



<u>Aerial Structure:</u>	Trackway section placed on a structure, other than a culvert, which spans above earthen, paved, or water surfaces including roadways, railroads, and water channels. Also, called elevated guideway.
<u>Aerodynamic Force:</u>	In regard to pantograph, additional vertical force applied to the pantograph as a result of air flow around the pantograph assembly.
<u>Alignment:</u>	The horizontal and vertical route of a transportation corridor or path.
<u>Ambient Noise Sensor:</u>	Sensor which detects background noise to automatically adjust Public Address output level to maintain audible output level.
<u>Ambient Temperature:</u>	Outdoor air temperature measured with a thermometer (or other temperature measuring device) and located so that it is protected from direct sunlight and wind effects.
<u>Americans with Disabilities Act (ADA):</u>	Federal regulation establishing legal requirements for accessibility. The Act prohibits discrimination on the basis of disability in employment, State and local government, public accommodations, commercial facilities, transportation, and telecommunications.
<u>Approximate Location:</u>	In regard to underground facilities, the “approximate location of subsurface installations” being a strip of land not greater than 24 inches on either side of the exterior surface of the subsurface installation. “Approximate Location” does not define depth.
<u>Arc:</u>	(Electrical arc) Electrical discharge which breaks down the insulation characteristic of air, permitting current to jump across the space between two contacts.
<u>Arcing:</u>	In regard to pantograph, the flow of current through an air gap between a pantograph contact strip and the contact wire, which results in erosion of both elements and is usually indicated by the emission of intense light, and which can result in radio frequency interference.
<u>Area of Impact:</u>	The area of required utility construction or relocation due to the CHSTP.
<u>Area of Influence:</u>	The area parallel to and 900 ft transverse to the centerline of the nearest track, or as defined in the Environmental Document, whichever is greater.
<u>At-Grade:</u>	At ground surface level; used to describe roadways, river crossings, and track alignments.
<u>Attenuation Relationship:</u>	Semi-empirical relationship to predict ground motions from a specific seismic source and event.
<u>Attenuation Time:</u>	The time required for the vehicle motion to stabilize after crossing a point of change in the nature of the alignment.
<u>Aspect:</u>	The appearance of a wayside signal, conveying an indication, as viewed from the direction of an approaching train; the appearance of an On-board Cab Display as viewed in the cab.
<u>Authority:</u>	California High-Speed Rail Authority.



<u>Authorized Person:</u>	Any person who has been authorized by the Agency to enter restricted areas of the property.
<u>Automatic Train Control (ATC):</u>	The collective name for the train control subsystems that comprise the Automatic Train Protection, the Automatic Train Operation, and Automatic Train Supervision sets of functions that govern train operations on the main tracks.
<u>Automatic Train Control Mode (ATC Mode):</u>	A mode of operation which allows the Locomotive Engineer to control the acceleration and braking of a train subject to supervision of Automatic Train Protection.
<u>Automatic Train Control Bypass Mode (ATC Bypass Mode):</u>	A mode of operation which allows trains to proceed under the manual control of the engineer when there is an on-board ATC failure. Permission to break the ATC seal and enter this mode must be granted by the train dispatcher. Movement must not exceed the speeds prescribed by the operating rules and procedures.
<u>Automatic Train Control – Automatic Train Operation Mode (ATC-ATO Mode):</u>	A mode of operation in which the ATC system controls the acceleration and braking of a train subject to supervision of Automatic Train Protection.
<u>Automatic Train Control Territory:</u>	Territory equipped with ATC wayside equipment.
<u>Automatic Train Operation (ATO):</u>	The functional set responsible for the automatic operation of throttle and brake commands to move trains between stations and other stopping locations (including those required due to the proximity of other trains and signal status) within the constraints imposed by the ATP functional set. Provides dwell timing at stations and the control or prompting of the opening and closing of train doors.
<u>Automatic Train Protection (ATP):</u>	The functional set responsible for the safety-critical functions including those of interlocking, train detection, signal aspects, broken rail detection, hazard detectors (if implemented as part of the ATC system), and movement authorities (including speed limit and cab signal commands if appropriate) that are sent to the train and acted upon by the on-board train control to enforce safe limits. The ATP functional set includes the enforcement of the safety-critical functions. Positive Train Control functions are part of ATP.
<u>Automatic Train Supervision (ATS):</u>	The functional set within the automatic train control system that is responsible for the centralized supervision and control of train movements; the ATS monitors trains, adjusts the performance of individual trains to maintain schedules, and provides data to adjust service to minimize inconveniences otherwise caused by irregularities. ATS also provides automatic and manual route setting at interlockings and the identification and tracking of trains, the display of alarms and events, and logging and storage of event data.



<u>Autotransformer:</u>	Apparatus which helps boost the overhead contact system (OCS) voltage and reduce the running rail return current in the 2X25 kV autotransformer feed configuration. It uses a single winding having three terminals. The intermediate terminal located at the midpoint of the winding is connected to the rail and the static wires, and the other two terminals are connected to the catenary and the negative feeder wires, respectively.
B	
<u>Backslope:</u>	Resultant excavation face located between outer shoulder line and natural ground line.
<u>Back-of-House Area:</u>	Area dedicated to station operational and support functions, with access restricted to station employees.
<u>Backwater:</u>	An unnaturally high state in stream caused by obstruction or confinement of flow, as by a dam, a bridge, or a levee. Its measure is the excess of unnatural over natural stage, not the difference in state upstream and downstream from its cause.
<u>Ballast:</u>	A selected material, usually crushed rock without fines, placed in a track to hold its position, distribute weight, dissipate force, and provide drainage.
<u>Ballasted Track:</u>	Track constructed with ties supported by and normally embedded in ballast.
<u>Ballast-less Track:</u>	See Non-Ballasted Track.
<u>Barrier:</u>	A device intended to contain or redirect an errant vehicle by providing a physical limitation through which a vehicle would not typically pass.
<u>Barrier Offset Distance:</u>	The lateral distance from the centerline of the track to the face of the barrier, trackside, or other roadside feature.
<u>Base Flood:</u>	The flood having a one percent chance of being equaled or exceeded in any given year. This is the regulatory standard also referred to as the "100-year flood".
<u>Betterment:</u>	Improvements to the capacity and/or functionality of a utility system that is not required for safety, operation, and construction of California High-Speed Train (CHST) system.
<u>Blanket:</u>	A layer of coarse grained material between ballast and subgrade, spread over entire width. It may be required over the formation where the subgrade soil is of poor quality, rainfall is heavy, and traffic density is high, as the absence of blanket in such cases can lead to problems in service.
<u>Block:</u>	A length of track of defined limits on which train movements are governed by information provided by the On-board Cab Display, by interlocking signals, or by authorized manual methods.
<u>Blockage Ratio:</u>	Ratio of train cross section area to tunnel cross section area.
<u>Brake Horsepower:</u>	Actual horsepower applied to a fan shaft by the motor.



<u>Broadband Radio System:</u>	Part of the Radio System, designed to transmit high-bandwidth data between moving high-speed trains and the fixed wayside.
C	
<u>Cab:</u>	The location on a locomotive or high-speed train set from which the engine or train is operated by the locomotive engineer. The location on an IMV from which on-track maintenance vehicle is operated by the driver.
<u>Cable Infrastructure (CI):</u>	The fiber optic and copper infrastructure and supporting equipment used to interconnect systems and field device equipment.
<u>Cantilever:</u>	In regard to OCS, a frame for supporting and registering the OCS conductors, often including solid core insulators; for auto tensioned systems, the cantilever connections at the pole are hinged to accommodate along track movement of the conductors, thereby allowing the end of the cantilever away from the pole to swing.
<u>Capable Fault:</u>	A mapped or otherwise known Quaternary fault with evidence of Holocene displacement, structural relationship to related Holocene faults, and/or where data are not sufficient to rule out the presence of Holocene movement.
<u>Casualty:</u>	A serious injury or fatality.
<u>Catenary:</u>	An assembly of overhead wires consisting of, as a minimum, a messenger wire, carrying vertical hangers that support a solid contact wire which is the contact interface with operating electric train pantographs, and which supplies power from a central power source to an electrically-powered vehicle, such as a train.
<u>Center Platform:</u>	Passenger platform in-between two station tracks.
<u>Closed Circuit Television (CCTV):</u>	The use of video cameras to transmit a visual signal to specific places with limited viewing and recording.
<u>Clothoid Spiral:</u>	The most common type of spiral. The radius increases at a linear rate over the length of the spiral. Also known as constant rate spiral.
<u>Code:</u>	A type of legislation that purports to exhaustively cover a complete system of law on a specific subject matter to define a procedure or performance requirement.
<u>Cohesive Subgrade:</u>	Subgrade constructed with soils having cohesive behavior, i.e., soils where shear strength is predominantly derived from cohesion of the soil is termed as cohesive subgrade. Normally, soils having particles finer than 75 micron exceeding 12 percent exhibit cohesive behavior. All fine grained soils and GM, GM-GC, GC, SM, SM-SC and SC types of soils exhibit cohesive behavior. Acronyms are from the Uniform Soil Classification System.
<u>Cohesionless Subgrade:</u>	Subgrade constructed with cohesionless, coarse-grained soils, i.e., soils where shear strength is predominantly derived from internal friction of the soil and is termed as cohesionless subgrade. GW, GP, SW and SP types of soils fall in this category. Acronyms are from the Uniform Soil Classification System.



<u>Communications Interface Cabinet (CIC):</u>	A stand alone cabinet containing racks used for Communications and Supervisory Control and Data Acquisition (SCADA) equipment.
<u>Concourse:</u>	Open space for the gathering or passage of patrons.
<u>Connectivity:</u>	Describes the degree of “connectedness” of a transportation system such as a transit network, and the ease with which passengers can move from one point to another within the network, or points outside the network.
<u>Consist:</u>	A set of rolling stock that forms a train in service, a consist for CHST can be a single trainset or more than one coupled together.
<u>Constant Rate Spiral:</u>	See clothoid spiral.
<u>Contact Force:</u>	The sum of forces for all contact points of one pantograph.
<u>Contact Point:</u>	Point of mechanical contact between a pantograph contact strip and a contact wire.
<u>Contact Wire:</u>	A solid grooved, bare aerial, overhead electrical conductor of an OCS that is suspended above the rail vehicles and which supplies the electrically powered vehicles with electrical energy through roof-mounted current collection equipment - pantographs - and with which the current collectors make direct electrical contact.
<u>Contact Wire Height:</u>	Height of the underside of the contact wire above top of rail level when not uplifted by the pantograph of an electric train.
<u>Containment:</u>	Engineered structure (steel, concrete or earthworks) designed to maintain a vehicle within a defined area.
<u>Contours:</u>	A variable curve that connects points with the same elevation value used to depict surface elevations on a contour map.
<u>Control:</u>	An established point on the earth's surface with a known position in the X, Y, Z coordinates and used for reference and mapping of field surveys.
<u>Control Center:</u>	<p>The location from which remote control signal appliances and switches are operated and operational decisions are made. On the CHST system these control centers are designated as:</p> <ul style="list-style-type: none"><li>• Operations Control Center (OCC) – The main control center that will have direct control of all main track operations outside those areas controlled by the Regional Control Centers and general supervisory oversight of all railroad operations system-wide.</li><li>• Regional Control Center (RCC) – Two RCCs, one each located in Northern and Southern California will have direct control of all main track operations on the Peninsula Corridor and LOSSAN Corridor, respectively.</li><li>• Yard Control Center (YCC) – The yard component of the Heavy Maintenance Facility (HMF) and the Terminal Storage and Maintenance Facilities (TSMF) will each have a YCC staffed by a yardmaster and a train dispatcher who will be jointly responsible for direct control of operations, including all remotely controlled signals and switches, within the limits of the yard.</li></ul>



<u>Controlled Access:</u>	Refer to "Access Control".
<u>Conventional Rail:</u>	Traditional intercity passenger rail services of more than 100 miles with as little as 1 to as many as 7-12 daily frequencies; may or may not have strong potential for future high-speed rail service. Top speeds of up to 79 mph generally on shared track. Intended to provide travel options and to develop the passenger rail market for further development in the future.
<u>Counterpoise:</u>	A buried wire or a configuration of wires constituting a low resistance grounding system or portion of a grounding system.
<u>Crossover</u>	A pair of turnouts connecting parallel tracks.
<u>Customer Assistance Intercom (CAI):</u>	Intercoms installed for passengers to report emergencies or obtain general travel information from local or remote Authority personnel. CAIs have two buttons for these two different functions. Part of the TIS.
<u>Customer Information Monitor:</u>	A visual information device that is full color and able to display detailed image information from the Public Address and Customer Information Sign (PACIS) system. Part of the PACIS system.
<u>Customer Information Sign:</u>	A visual information device that is monochrome and able only to scroll text information from the PACIS system. Part of the PACIS system.
<u>Cut-and-Cover:</u>	Construction technique in which a trench is excavated, infrastructure is installed, and the trench is closed.
<u>Cut and Fill:</u>	Construction technique involving excavation or grading followed by placement and compaction of fill material.
<b>D</b>	
<u>Datum:</u>	A reference from which measurements are made for establishing horizontal and vertical control.
<u>Dead Load:</u>	Static Load that is relatively constant throughout the life of a structure.
<u>Dedicated Corridor:</u>	A segment of right of way within the CHST System where the main tracks are used exclusively for HST operations only, designated as such in the operating rules, and where these main tracks are completely separated physically from all other railroad tracks. The operation of trains (passenger and freight), other than the HST, over these tracks, is strictly prohibited in the operating rules and by regulation.
<u>Dedicated Track:</u>	A main track designated in the operating rules for the exclusive use of CHST operations. All other train movements, passenger and freight, are prohibited and restricted by the operating rules and by regulation. It may or may not be in a Dedicated Corridor.
<u>Degree of Curve:</u>	The central angle turned by a curve in 100 feet. It is closely approximated by $D_c = 5730 \text{ feet} / \text{Radius}$ . Railroad curves are defined by the Chord Definition, in which the length is described by a 100 foot long tangent between two points on the arc of the curve. The exact formula for chord definition curves is $D_c = 2 * \arcsin(50 / \text{Radius})$ .



<u>Derail:</u>	A track safety device designed to guide a locomotive or car off the rails at a selected spot as a means of protection against collisions and other accidents.
<u>Design Criteria:</u>	The direction for design of the system. The Design Criteria consist of mandatory items in the Design Standards and preferred items in the Design Guidelines.
<u>Design Frequency:</u>	The recurrence interval for hydrologic events used for design purposes.
<u>Design Guidelines:</u>	Provide a preferred but not necessarily required direction for a particular design feature. Guidelines are designated by the word "should" or "may".
<u>Design Life:</u>	The projected period of time for which a design element will perform while meeting minimum specifications under a particular maintenance regimen.
<u>Design Method:</u>	Load and Resistance Factor Design (LRFD) methods are preferred for force based structural and geotechnical design.
<u>Design Speed:</u>	The maximum permissible speed along a segment of alignment based on the design specification of the track infrastructure, signaling system characteristics, and the maintenance specifications for that class of track.
<u>Design Standards:</u>	<p>Indicate required directions for a particular design feature. Language relating to standards will typically include the word "shall". An approved design variance is required for any deviation from the standards (see "Exceptional" below).</p> <p>The design standards (classifications) presented in these documents will normally be described using three terms:</p> <p>Desirable: The standard which shall be equaled or exceeded where there are no constraints. In regard to the alignment, desirable horizontal and vertical standards may be used in any combination.</p> <p>Minimum/Maximum: The standard which shall be equaled or exceeded where constraints make a Desirable standard unobtainable or significantly more expensive than Minimum/Maximum standards. Even if a Desirable standard is not obtainable, it shall be approached as nearly as practical.</p> <p>Exceptional: The standard which shall be achieved at the absolute minimum and only where Minimum/Maximum standards are either unobtainable or exorbitantly expensive. Even if Minimum/Maximum standards are not obtainable, they shall be approached as nearly as practical. An approved design variance is required for the use of an Exceptional standard.</p>
<u>Design Storm:</u>	That particular storm which contributes runoff which the drainage facilities were designed to handle.
<u>Desirable:</u>	See Design Standards.
<u>Digital Terrain Model:</u>	A three-dimensional model of digital surfaces of topographic features.



<u>Directivity and Near Source Effects:</u>	The effects of direction of fault rupture and closeness to the fault on ground motion.
<u>Disconnect Switch:</u>	A no-load interrupting type electrical switch for disconnecting electrical power from a line section.
<u>Diverging Speed:</u>	Maximum speed for a train using the diverging route through a turnout.
<u>Dual Control Switch:</u>	A power operated switch that may also be operated by hand. Dual control switches are found only within the limits of a yard.
<u>Dwarf Signal:</u>	A low wayside signal with minimal preview that is used to provide adequate preview of the aspect displayed to high-speed trains.
<u>Dwell:</u>	The time from wheel stop to wheel start of a train performing a scheduled stop at a station.
<u>Dynamic Envelope:</u>	<p>In regard to pantograph, a clearance envelope around the pantograph static profile that takes into account the pantograph sway and pantograph uplift under dynamic conditions.</p> <p>In regard to vehicles and tracks, it is the trace of the maximum limits of movement of the vehicle in normal service. This outline is defined by the limits of motion due to wear of various components to their limits and includes deficiencies, such as deflated / overinflated airbags, etc. When defined from the perspective of the vehicle, it normally does not include any track deviations. When defined from the perspective of the infrastructure, track deviations are included. Also called Kinematic Envelope.</p>
E	
<u>Earthwork:</u>	A general term applying to excavations and embankments, and the movement of soil and rock.
<u>Electric Lock Switch:</u>	A hand-operated switch, typically restricted to yards, that is equipped with an electrically controlled device that restricts the movement of the switch.
<u>Electrical Clearance – Dynamic (Passing):</u>	The minimum permissible clearance distance between the OCS messenger wire, contact wires, pantograph, or other live parts of either the vehicle or OCS and the grounded vehicle load gauge, overhead structure, or other adjacent fixed structure under dynamic operating conditions, such as during the passing of a train or the movement of the conductors due to heating or climatic conditions.
<u>Electrical Clearance – Static:</u>	Minimum clearance between live parts of either a vehicle pantograph or the OCS, and grounded (earthed) parts of either a vehicle or adjacent fixed structure, while the vehicle and the live parts are stationary.
<u>Electrical Clearance - Safety:</u>	The distance in a straight line between a standing surface accessible to persons and energized parts necessary to prevent direct contact with energized parts, as defined in EN 50122-1: 1997 Section 5.



<u>Electrical Section:</u>	This is the entire section of the OCS which, during normal system operation, is powered from an SS circuit breaker. The SS feed section is demarcated by the phase breaks of the supplying SS and by the phase breaks at the adjacent SWS or line end. An electrical section may be subdivided into smaller elementary electrical sections.
<u>Elementary Electrical Section:</u>	This is the smallest section of the OCS power distribution system that can be isolated from other sections or feeders of the system by means of disconnect switches and/or circuit breakers.
<u>Electromagnetic Field (EMF):</u>	The force field that extends outward from any moving electrical current, consisting of both a magnetic field and an electric field.
<u>Electromagnetic Interference:</u>	An electrical emission or disturbance that causes degradation in performance or results in malfunctions of electrical or electronic equipment, devices, or systems.
<u>Emergency Intercom:</u>	Intercoms installed for passengers to report emergencies and have a single button to perform this function. Part of the TIS.
<u>Emergency Telephone (ETEL):</u>	Telephones adjacent to the motor-operated OCS disconnect switches. These telephones are used by Authority staff to contact the Traction Electrification Power coordinator to report emergencies. Part of the TIS.
<u>Embankment or Fill:</u>	In regard to earthwork for track bed, artificial mound of imported material generally made of selected earth, gravel, or stone; built to support the HST when the reference line of the longitudinal profile is above the natural ground.
<u>Entrance Facility:</u>	A room in a building where cabling terminates. Cabling may be Authority cabling, third party cabling, or both.
<u>Epoch:</u>	As used in surveying, a specific date (time stamp) that all positions are based upon.
<u>Equilibrium Superelevation:</u>	The calculated superelevation that exactly balances the lateral force of the train on the curve at the defined speed. Normally called Balancing Cant or Equilibrium Cant in European publications.
<u>Erosion:</u>	The loosening, dissolving, or wearing away of earth materials in response to weathering, interaction with flowing water, wave action, or wind.
<u>Exceptional:</u>	See Design Standards.
<u>Exclusive Use Corridor:</u>	See Dedicated Corridor.
<u>Expansive Soils:</u>	Soils that undergo swelling and shrinkage when wetted and dried.
F	
<u>Fail safe:</u>	<p>For railroad related safety: A design principle the objective of which is to eliminate the hazardous effects of a failure of a component or system.</p> <p>For non-railroad safety related design: A design feature that ensures that the system remains safe or in the event of a failure will cause the system to revert to a state which will not cause a mishap.</p>



<u>Fare Collection Line:</u>	Demarcation between Free Area and Paid Area.
<u>Fare Gate Array:</u>	Physical barrier which requires a valid CHST ticket to pass.
<u>Fare Gates:</u>	Physical barrier which requires a valid CHST ticket to pass. Also referred to as a Fare Gate Array.
<u>Fault Hazard Zone:</u>	Overall zone within which deformations related to fault rupture may occur and should be considered in the design.
<u>Feasible:</u>	Capable of being implemented.
<u>Feeder:</u>	A current carrying electrical connection between the OCS and a traction power facility (SS, SWS or PS).
<u>Feeder Route:</u>	Branch routes that feed into main (arterial) routes.
<u>Fiber Optic Cable System:</u>	A data transmission technology that relies on light rather than electricity, conveying data through a cable consisting of a central glass core surrounded by layers of plastic. Part of Cable Infrastructure.
<u>Fire Alarm System (FAS):</u>	System which monitors the station areas, control centers, facilities, and ancillary areas including spaces located within tunnels for fire; initiates alarms; activates the fire suppression systems; alerts the monitoring and response organizations to the incident; and assists in the fire emergency evacuation processes.
<u>Flyover:</u>	A bridge that carries one road or rail alignment aerially over another.
<u>Footprint:</u>	Area of the ground surface covered by a facility or affected by construction activities.
<u>Foreslope:</u>	In fill sections, the resultant slope of the fill that allows to safely support track and road subgrade and that places the subgrade at safe height above the maximum water and flooding level.
<u>Formation:</u>	It is a general term referring to the whole of blanket, subgrade, and subsoil.
<u>Formation Top:</u>	Boundary between ballast and top of blanket or subgrade (where blanket layer is not provided).
<u>Free Area:</u>	Areas within a station which are open to the general public.
<u>Freeboard:</u>	The vertical distance between the level of the water surface usually corresponding to the design flow and a point of interest such as a bridge beam, levee top or specific location.
<u>Free Cross Section Area:</u>	The standard tunnel cross section area excluding clearance for tunnel design details and fixed equipment.
<u>Frequency:</u>	The number of times a field, such as an electromagnetic field, changes direction in space each second. Also, the number of trains, flights, or other transportation service occurring in a given time period.
<u>Frog (Turnout):</u>	<ul style="list-style-type: none"> <li>Fixed Frog: Term essentially synonymous with Frog. "Fixed" is sometimes used as part of the name on railroad systems that also use spring frogs and swing nose frogs in order to clarify the type of frog used in a given situation.</li> <li>Spring Frog: A frog without a fixed open flangeway on one</li> </ul>



side between the frog point and wing rail that has springs holding that wing rail up against the frog point on that side so as to provide unbroken wheel support for the main track. The other wing rail is fixed. Main track traffic travels on the fixed wing side of the frog, not moving the frog. The wheels of diverging side traffic opens the sprung wing rail which is then forced closed by the spring after the wheel has passed. Spring frogs are either right handed or left handed. These devices are normally used only where the traffic on the side springing the wing rail is 20 percent or less of the total traffic over the frog. These devices are generally unknown outside North America.

- **Swing Nose Frog:** A frog in a turnout with a movable frog point connected to a switch machine for manipulation relative to the switch position.
- **Point of Frog:** In American terminology, the point where the gauge lines are 1/2 inch apart, or the point located one-half the distance in inches from the intersection of the gauge lines of the rails through the frog. In European terminology, the theoretical point of intersections of the gauge lines of the rails through the frog. The point, as defined in European terminology, is usually called the theoretical point of frog in American terminology.
- **Heel of Frog:** End of rails that are part of the frog assembly on the end away from the switch
- **Toe of Frog:** End of rails that are part of the frog assembly on the end toward the switch.

A frog is commonly called a Crossing in European terminology.

## G

### Gantry:

Portal frame spanning a railroad track or tracks for supporting and displaying signals, or installed parallel to the track(s) at TPFs to support disconnect switches and for connecting feeder cables from the TPF to the OCS.

### Global System for Mobile Communications - Railway (GSM-R):

An international wireless communications standard for railway communications. GSM-R is a sub-system of European Rail Traffic Management System (ERTMS). It is used for communication between train and railway regulation control centers for communication and control.

### Geographic Information System (GIS):

An information management system designed to store and analyze data referenced by spatial or geographic coordinates.

### GEOID09:

Gravimetric hybrid geoid height model developed by NGS containing the separation between NAD83 and NAVD88 and is the basis for elevations (orthometric heights) using GPS survey methods.



<u>Geosynthetics:</u>	<p>Structural elements made of synthetic materials for use in earthworks and construction of track bed layers. A distinction is made between:</p> <ul style="list-style-type: none"><li>• Geotextiles: Geosynthetics (woven or non-woven), which may be used for separation, filtering, drainage and reinforcement.</li><li>• Geomembranes: Geosynthetics (synthetic or bituminous layer) impermeable to water, which may be used for protection of sensitive subgrade against penetration of surface water or for protecting ground water against pollution.</li><li>• Geogrids: Fine or coarse mesh geosynthetics, which may be used for separation and reinforcement.</li><li>• Geocomposite: Compound structure made of at least two layers of geosynthetic materials.</li></ul>
<u>Global Positioning System (GPS):</u>	<p>A space-based global navigation satellite system that provides location and time information in all weathers and at all times anywhere on or near the Earth when and where there is an unobstructed line of sight to four or more GPS satellites.</p>
<u>GPS Network Timing System (GNTS):</u>	<p>Timing system which provides accurate time-of-day synchronization to devices and systems within the CHST system. For example, wall clocks will be field devices of the GNTS.</p>
<u>Grade Crossing:</u>	<p>The intersection of a railroad and a highway at the same elevation (grade); an intersection of two or more highways; an intersection of two railroads.</p>
<u>Grade, Gradient:</u>	<p>The slope of changes in elevation, defined in percentage %, as feet of rise in 100 feet. Sometimes defined in European publication as millimeters of rise in one meter, in which case it is normally written as ‰.</p>
<u>Grade Separation Structures:</u>	<p>In respect to CHST:</p> <ul style="list-style-type: none"><li>• Underpass: HST passes under roadway or other railroad.</li><li>• HST Overpass: HST passes over roadway or other railroad.</li><li>• HST Aerial Structure: HST is elevated. HST passes over roadways, bikeways, and other railroads where they occur.</li><li>• HST Bridge: HST passes over water feature.</li></ul> <p>In respect to Roadway Structures: Refer to Caltrans Nomenclature.</p>
<u>Grade-Separated:</u>	<p>At different elevations; on separate levels.</p>
<u>Grid:</u>	<p>A system of interconnected power generators and power transmission lines that is managed to meet the requirements of electrical energy users connected to that transmission system at various points.</p>



<u>Ground Grid (Mat):</u>	A buried grid for installations, such as substations and disconnect switch platforms, which provides a low resistance path to ground and reduces touch-and-step potentials for operators of the equipment.
<u>Ground Potential Rise (GPR):</u>	The maximum electric potential that a substation grounding grid may attain relative to a distant grounding point assumed to be at the potential of remote earth. The GPR is equal to the maximum grid current times the grid resistance to earth.
<u>Ground Rod:</u>	A metal rod driven into the ground with ground wire connection to structures or equipment to disperse currents to ground (earth).
<u>Ground Wire:</u>	A conductor installed for the purpose of providing electrical continuity between a device or equipment and a grounding system.
<u>Grounded:</u>	Connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to limit the build-up of voltages to levels below that which may result in undue hazard to persons or to connected equipment.
<u>Groundwater:</u>	Water contained and transmitted through open spaces within rock and sediment below the ground surface.
<u>Guard Rail:</u>	A length of rail placed adjacent to the rail across from a frog to guide wheels through the frog. Some guardrails are fabricated from a special section produced for that purpose.
<u>Guard Railing:</u>	A metal railing acting as a safety barrier at the side of a freeway, highway or road to prevent errant vehicles from leaving the traveled way.
<u>Guideway:</u>	A track or riding surface that supports and physically guides vehicles specially designed to travel exclusively on it. For the CHSTP, use "trackway" in lieu of guideway.
<u>Guidelines:</u>	Non-mandatory, recommended, and supplemental information regarding generally acceptable methods to satisfy provisions of a regulation, code, or standard. In regard to the CHSTP Design Manual application, see Design Guidelines.
H	
<u>Half-Sine Spiral:</u>	A spiral with a defined variation in the change of radius, usually in the form of a sine wave curve so as to reduce the entry and exit change in the rate of change. Recommended in high-speed operation, particularly if the track is on a concrete base. Also called variable rate spiral. .
<u>Hazard:</u>	Hazards encompass all aspects of technology or activities that produce risk. Hazards include the characteristics of things and the actions or inactions of people.
<u>Hazardous Fault:</u>	A fault that meets the following criteria: $\geq 1.0$ mm/year Slip Rate (SR) and/or $\leq 1,000$ year Recurrence Interval (RI).
<u>Hazardous Minerals:</u>	Naturally occurring minerals contained within soil or rock that contain minerals known to be harmful if inhaled, ingested, or in contact with skin.



<u>Headspan:</u>	An across-track support arrangement comprising two or more wires that provide support for one or more OCS equipments. Headspans can be attached to two separated poles or to wayside buildings or other fixed structures.
<u>Headway:</u>	The time between trains at a given point. For example, a 15-minute headway means that one train arrives, departs or passes every 15 minutes.
<u>Heavy Maintenance Facility (HMF):</u>	A yard facility that provides overnight and mid-day rolling stock storage and Level 1 to 5 maintenance capabilities.
<u>Help Point Intercom (HPI):</u>	Intercoms installed for passengers to communicate with Authority personnel to report emergencies and obtain general travel information. HPIs have two buttons for these two different functions. Part of the TIS.
<u>High Risk Utility:</u>	Utilities/Facilities conducting the following materials, whether encased or not, are considered to be High Risk: <ol style="list-style-type: none"><li>1. Petroleum products.</li><li>2. Oxygen.</li><li>3. Chlorine.</li><li>4. Toxic or flammable gases or liquids.</li><li>5. Natural gas in pipelines of any size.</li><li>6. Underground electric supply lines, conductors or cables that have a potential to ground of more than 300 volts, either directly buried or in duct or conduit, which do not have concentric grounded or other effectively grounded metal shields or sheaths.</li><li>7. Water in pressured pipeline 6 inches or greater in diameter or pipelines of any size with normal operating pressure greater than 60 psi.</li><li>8. Other utilities that could disrupt the operation of CHST system.</li></ol>
<u>High Signal:</u>	A signal located such that its aspect can be detected by train operators sufficiently in advance of the time the train passes the signal such that the train operator can identify the aspect and take proper action by the time the train reaches the signal.
<u>High-Speed Main Tracks:</u>	See main track.
<u>High-Speed Train:</u>	Train designed to operate safely and reliably at speeds near 200 mph (320 kph).
<u>High-Speed Railroad:</u>	A railroad system utilizing steel-wheel-on-steel-rail technology with a regular operating speed greater than 125 mph (200 km/h).
<u>Highway-Rail (Hi-Rail) Vehicle:</u>	A type of Infrastructure Maintenance Vehicle equipped with both rubber tires and steel wheels allowing it to operate on either a highway or railroad track.
<u>Holocene Fault:</u>	Fault with most recent movement within the past 11,000 years.



<u>Home Signal:</u>	A signal (wayside or virtual) at the entrance to an interlocking to govern trains entering the interlocking.
<u>Human Machine Interface (HMI):</u>	The user interface to systems or equipment. It is the space where interaction between humans and machines occurs.
<u>Hut:</u>	Small self contained enclosure to protect and secure specialized equipment.
I	
<u>Impedance Bond:</u>	An electrical device located between the rails consisting of a coil with a center tap used to bridge insulated rail joints in order to prevent track circuit energy from bridging the insulated joint while allowing the traction return current to bypass the insulated joint. The center tap can also be used to provide a connection from the rails to the static wire and/or traction power facilities for the traction return current.
<u>Indication:</u>	The information conveyed by the appearance of the On-board Cab Display in the cab. The information conveyed by the aspect of a fixed wayside signal.
<u>Infrastructure Maintenance Vehicle (IMV):</u>	Infrastructure maintenance equipment operated on track for inspection or maintenance that may not shunt track circuits or operate signals.
<u>Insulated Joint:</u>	A joint in the running rail used to prevent track circuit energy on one side of the joint from leaking to the other side of the joint.
<u>Insulated Overlap:</u>	A sectionalizing point in the catenary formed by cutting insulation into the out-of-running conductors of the two adjoining and overlapping catenaries, having between them in the overlap span an electrical clearance realized by an air gap. The contact and messenger wires of these two overlapping tension lengths that terminate at opposite ends of the overlap section create a sectionalizing point in the catenary as required for operational and maintenance reasons, and permit the passage of pantographs under power from one energized electrical sub-section to the next, both supplied by the same traction power source.
<u>Integrated Information Management Platform (IIMP):</u>	Platform which integrates and leverages information from multiple stand-alone communications systems and other devices and systems for streamlined and coherent operation, monitoring, and control.
<u>Interceptor Ditches:</u>	Above a cut slope, they carry runoff from the watershed served and prevent surface runoff from entering the cut.
<u>Interlocking:</u>	An arrangement of signals (wayside and/or virtual) and switch appliances so interconnected that their movement must succeed each other in proper sequence and for which interlocking rules are in effect.
<u>Interlocking Signals:</u>	Fixed signals which govern the movement of trains through Interlockings that are observed by the train operator under ATC failure conditions at reduced speed.



<u>Intermediate Station:</u>	Any station between two terminal stations. Intermediate HST stations will include additional tracks to allow for through running express services.
<u>Intermodal:</u>	Describes transportation that involves more than one means (walk, bike, auto, transit, taxi, train, bus, air, etc.) during a single journey.
<u>Interoperability:</u>	In the context of the European High Speed Lines, the capability of the European High-Speed lines railway network to permit high speed trains to run safely and continuously with specified performances. It is based on legal, technical and operational conditions that must be fulfilled to satisfy the necessary requirements. Thus, for example, a German high-speed train satisfying the requirements of the Rolling Stock Technical Specification for Interoperability (TSI) is able to run safely and continuously on a French High-Speed Line, the infrastructure of which satisfies the requirements of the various infrastructure Technical Specifications for Interoperability. These TSI design standards were developed specifically for the design, construction and operation of interoperable high-speed railways in Europe and are based on European and international best practices.
<u>Intrusion:</u>	Entry of errant vehicles, goods, objects and people into the operating space of HST or other transportation system. An errant vehicle's exit out of its right-of-way and entry into the operating space of another transportation system's right-of-way.
<u>Intrusion Detection System:</u>	An electronic system that alerts the Control Center of an intrusion event and may result in train movement restriction.
<u>Intrusion Protection:</u>	Physical structure or space which will prevent entry of errant vehicles, goods, objects, and people into the operating space of CHST or other transportation system.
<u>Island Platform:</u>	See Center Platform.
K	
<u>Karst Terrain:</u>	A type of topography that is formed by subsurface dissolution of minerals, including mapped or otherwise known subsurface naturally occurring or man-induced voids.
<u>Kiss-and-Ride:</u>	Facility for private vehicles to drop off or pick up CHST patrons.
L	
<u>Land Subsidence:</u>	The gradual downward settlement or sinking of the ground surface.
<u>Landslide:</u>	Mapped or otherwise known rock falls, mud flows, debris flows, landslides, and other forms of slope failures.
<u>Lead (Turnout):</u>	The distance from the actual point of switch to the 1/2 inch point of frog.
<u>Level of Service (LOS):</u>	A rating using qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers.



<u>Life Cycle:</u>	All phases of the system's life including design, research, development, test and evaluation, production, deployment (inventory), operations and support, and disposal.
<u>Line Side Drains:</u>	Drains which collect and discharge surface water, seepage water, and ground water into a controlled outlet. Generally a distinction is made between buried drains, open channels, and side ditches.
<u>Liquefaction:</u>	Reduction of soil strength because of excess pore water pressure due to earthquake ground shaking when saturated.
<u>Live:</u>	An electrically energized circuit or component.
<u>Live Load:</u>	Load that varies due to dynamic factors within the normal operating cycle, but excluding seismic effects.
<u>Live Part:</u>	A part or component connected to an energized circuit and therefore live and not insulated from the energized circuit.
<u>Local Area Network (LAN):</u>	A network which provides network connectivity between terminals, servers, switches, sensors, and other electronic/optical equipment within a station or operational facility.
<u>Longitudinal:</u>	A facility located parallel to and within highway, existing railway, or proposed Authority right-of-way.
<u>Low Risk Utility:</u>	Facilities that are not covered under the definition for "High Risk Utility" are considered to be Low Risk Utilities.
M	
<u>Mainline:</u>	In respect to CHST system, the mainline is the main route typically consisting of two main tracks. Mainline also includes passing track and station track. Mainline does not include maintenance sidings and yard track. Also, main line, revenue tracks, and revenue service tracks.
<u>Main Track:</u>	A track designated for the movement of trains at normal commercial speed having their movement protected by a control system. Tracks for the primary purpose of access to stations, yards, and other auxiliary facilities are not main tracks regardless of the presence or absence of movement protection system on those tracks. On CHST system, scheduled stops of any kind, including station stops will not normally be permitted on main tracks. On CHST system main tracks, all movements are protected by the ATC system.
<u>Maintenance:</u>	Regular activities that are required to support safe operations and the intended use of the high-speed train system such as inspection and correction of deviations from the design along the track.
<u>Maintenance Management Information System (MMIS):</u>	A system that provides various management and statistical functions to support the users in organizing the planning of rolling stock maintenance work and providing the relevant information necessary for decision making.
<u>Maintenance Siding:</u>	A track dedicated to parking maintenance equipment and trains and normally connected to a passing track.



<u>Major Utility:</u>	Any subsurface, above ground, or overhead facility used for transmission, regardless of size, shape, or method of conveyance.
<u>Maximum Considered Earthquake (MCE):</u>	Ground motions corresponding to greater of (1) a probabilistic spectrum based upon a 10 percent probability of exceedance in 100 years (i.e., a return period of 950 years) and (2) a deterministic spectrum based upon the largest median response resulting from the maximum rupture (corresponding to Mmax) of any fault in the vicinity of the structure.
<u>Maximum Authorized Speed (MAS):</u>	The highest speed that is permitted over a specific portion of the railroad alignment. It may be authorized by special instructions of the current timetable, operating rules, or any other publication authorized by the chief operating officer.
<u>Maximum Contact Force:</u>	The maximum value of the contact force exerted by the pantograph on the contact wire. Sometimes, maximum force.
<u>Mean Contact Force:</u>	The statistical mean value of the contact force exerted by the pantograph on the contact wire. Sometimes, mean force.
<u>Medical Health Criterion:</u>	Maximum pressure variation (peak-to-peak value) in the tunnel (outside of the train) independent of time.
<u>Messenger Wire:</u>	In catenary construction, the OCS Messenger Wire is a longitudinal bare stranded conductor that physically supports the contact wire or wires either directly or indirectly by means of hangers or hanger clips and is electrically common with the contact wire(s).
<u>Minimum Contact Force:</u>	The minimum value of the contact force exerted by the pantograph on the contact wire. Sometimes, minimum force.
<u>Minimum/Maximum:</u>	See Design Standards.
<u>Minor Utility:</u>	Any subsurface, above ground, or overhead facility used as distribution lines or service laterals to individual parcels or properties
<u>Modal:</u>	A transportation system defined on the basis of specific rights-of-way, technologies, and operational features.
<u>Movement Authority:</u>	The vital information used by the on-board ATC system to determine the position on the track(or limit) to which the train can safely move under ATC supervision, including the speed limits both permanent and temporary that must be observed between its current position and the Movement Authority limit.
N	
<u>National Spatial Reference System (NSRS):</u>	Datum, defined and managed by the National Geodetic Survey, and the foundation for the National Spatial Data Infrastructure (NSDI).



<u>Negative Feeder (NF):</u>	An overhead conductor supported on the same structure as the catenary conductors, which is at a voltage 25 kV with respect to ground but 180° out-of-phase with respect to the voltage on the catenary. Therefore, the voltage between the catenary conductors and the negative feeder is 50 kV nominal. The negative feeder connects successive feeding points, and is connected to one terminal of an autotransformer in the traction power facilities via a circuit breaker or disconnect switch. At these facilities, the other terminal of the autotransformer is connected to a catenary section or sections, via circuit breakers or disconnects.
<u>Network Management System (NMS):</u>	A system used to provision, test, and maintain network connectivity.
<u>Neutral Leads:</u>	The wires connecting the center tap of impedance bonds to other impedance bonds and/or to traction power ground circuits.
<u>Neutral Section:</u>	See Phase Break.
<u>Nominal Voltage:</u>	Voltage by which an installation or part of an installation is designated. The operating voltage of the OCS may differ from the nominal voltage within defined permissible tolerances.
<u>Non-Ballasted Track:</u>	Rail lines installed over concrete slabs for support.
<u>Non-operating Condition:</u>	The environmental/climatic conditions under which trains will not be permitted to maintain continuous operation and revenue service will cease.
<u>Non-public Area:</u>	Station areas accessible only to station staff and secured against unauthorized entry with lockable doors.
<u>Non-Standard:</u>	See Exceptional under Design Standards.
<u>Non-Vital:</u>	A designation placed on a system, subsystem, element, component, or function denoting that satisfactory operation of such is not mandatory for safety.
<u>North American Datum of 1983 (NAD 83):</u>	The horizontal control datum for the United States based on the Geodetic Reference System 1980 and with a geocentric origin.
<u>North American Vertical Datum of 1988 (NAVD 88):</u>	The vertical control datum established for surveying elevations in the United States based on the General Adjustment of the North American Datum of 1988.
O	
<u>OCS Pole:</u>	Vertical structural element supporting the overhead contact system equipment, which provides physical support, registration and/or termination of the OCS conductors including auxiliary wires.



<u>On-Board Cab Display (OCD):</u>	A display located in the cab of a train or infrastructure maintenance vehicle that displays to the operator the current speed, allowed speed, approaching speed restrictions ahead within a defined distance, the required braking curve that must be adhered to in order to maintain schedule, and other necessary operating information.
<u>Operating Basis Earthquake (OBE):</u>	Ground motions corresponding to a probabilistic spectrum based upon an 86 percent probability of exceedance in 100 years (i.e., a return period of 50 years).
<u>Operating Condition:</u>	The environmental/climatic conditions under which trains will be permitted to maintain continuous operation, and for which the OCS shall provide full, uninterrupted, and acceptable performance.
<u>Operating Envelope:</u>	A zone delineated by HST tracks and OCS.
<u>Operating Infrastructure:</u>	HST infrastructure that is required for operation of HST. This includes infrastructure within operating envelope plus other HST facilities required for operation of HST such as TP facilities, wayside power cubicles, train control rooms, communication rooms, and cable troughs.
<u>Operating Speed:</u>	The highest in-service speed that is achievable by a trainset technology on a segment of alignment that conforms to all of the requirements specified for that class of track. See also Maximum Authorized Speed.
<u>Operations Control Center (OCC):</u>	See Control Center.
<u>Operations Radio System (ORS):</u>	The voice and low-bandwidth data radio system for wireless communications between on-board equipment, mobile and portable users, and fixed users and systems. (If PSM-R is used, ORS may carry safety-critical train control data).
<u>Outboard Platforms:</u>	Side boarding platforms located directly opposite one another, each serving one track.
<u>Overhead Contact System (OCS):</u>	<p>OCS is comprised of:</p> <ol style="list-style-type: none"><li>1. The aerial supply system that delivers 2x25 kV traction power from substations to the pantographs of high-speed electric trains, comprising the catenary system, messenger and contact wires, stitch wires and hangers, associated supports and structures (including poles, portals, headspans and their foundations), manual and/or motor operated isolators, insulators, phase breaks, conductor termination and tensioning devices, downguys, and other overhead line hardware and fittings.</li><li>2. Portions of the Traction Power Return System consisting of the negative feeders and aerial static wires, and their associated connections and cabling.</li></ol>



<u>Overhead Contact Line Zone and Pantograph Zone:</u>	The zone whose limits, in general, are not exceeded by a broken overhead contact line in the event of a dewirement or by a damaged pantograph or broken fragments thereof which are energized.
<u>Overlap:</u>	See Uninsulated Overlap and Insulated Overlap.
<u>Owner:</u>	In the context of utility coordination, the owner of the underground or above ground utility or its authorized agent.
<u>Ownership:</u>	Any interest in land, real estate, or the improvements on it.
<u>P</u>	
<u>Paid Area:</u>	Areas on the platform side of the fare-paid line where possession of a valid CHST ticket is required.
<u>Pantograph:</u>	Current collector apparatus consisting of spring-loaded hinged arms mounted on top of electrically powered rail vehicles that provides a sliding electrical contact and collects current from the contact wire of the overhead contact system. The pantograph is designed to follow changes in the vertical height and lateral offset of the contact wire, and to provide for essentially vertical movement of the pantograph collector head.
<u>Pantograph Clearance Envelope:</u>	A clearance envelope around the pantograph static profile.
<u>Pantograph Current:</u>	Current that flows through the pantograph.
<u>Pantograph Head:</u>	Pantograph equipment comprising the current collector strips and their mountings.
<u>Pantograph Sway (Pantograph lateral displacement):</u>	Lateral displacement of the pantograph induced, under the dynamic passage of the electric vehicle, by vehicle and pantograph lateral displacements that include gauge deviation, roll and lateral vehicle shock loads, and cross-track tolerance.
<u>Parallel Feeder:</u>	See Negative Feeder.
<u>Paralleling Station (PS):</u>	An installation which helps boost the OCS voltage and reduce the running rail return current by means of the autotransformer feed configuration. The negative feeders and the catenary conductors are connected to the two outer terminals of the autotransformer winding at this location with the center terminal connected to the traction return system. The OCS sections can be connected in parallel at PS locations.
<u>Parcel:</u>	A distinct, continuous portion or tract of land.
<u>Park and Ride:</u>	Facility where CHST patrons can park and leave personal vehicles prior to transfer to HST.
<u>Passenger Aural Comfort Criteria:</u>	Maximum pressure change inside the train within a specified period of time to limit the discomfort on passengers' ears when passing through a tunnel.



<u>Passing Track:</u>	A designated track connected to a main track on both ends for the purpose of allowing a train to clear the main track as a part of normal operations, usually for the purpose of accessing a station platform, allowing train overtaking, or allowing trains to clear the main tracks to minimize delay in case of operational issues. For regulatory and signaling purposes the passing track is treated the same as a main track.
<u>Peak Period:</u>	Time period during the day with the greatest volume of CHST patrons.
<u>Performance Based Design:</u>	In regard to seismic design, a design based on specific performance criteria in addition to building code based safety criteria.
<u>Performance Criteria:</u>	<p>In regard to seismic design, for primary structures there are two levels of Performance Criteria:</p> <p>No Collapse Performance Level (NCL) for which structures are able to undergo the effects of the Maximum Considered Earthquake (MCE) with no collapse. Significant damage may occur which requires extensive repair or complete replacement of some components. Occupants not on trains are able to evacuate safely. Damage and collapse due to train derailment is mitigated through containment design. If derailment occurs, train passenger and operators are able to evacuate derailed trains safely.</p> <p>Operability Performance Level (OPL) for which structures are able to withstand the effects of the Operating Basis Earthquake (OBE) with elastic response with no spalling, and response within structural deformation limits, in order to limit rail stresses and protect against derailment. No derailment occurs; trains are able to safely brake from the maximum design speed to a safe stop; passengers and operators are able to evacuate stopped trains safely. Disruption of service for all systems supporting HST operations is minimal. Train operation resumes within a few hours and possibly at reduced speeds.</p>
<u>Phase Break:</u>	An arrangement of insulators and grounded or non-energized wires or insulated overlaps, forming a neutral section, which is located between two sections of OCS that are fed from different phases or at different frequencies or voltages, under which a pantograph may pass without shorting or bridging the phases, frequencies or voltages.
<u>Photogrammetry:</u>	The art, science, and technology of obtaining reliable information about physical objects and the environment through process of recording, measuring, and interpreting images and patterns of electromagnetic radiant energy and other phenomena.
<u>Pick-Up and Drop-Off:</u>	Facility for private and semi-private vehicles to drop off or pick up CHST patrons, which could include facilities for taxis, private shuttles, and rental cars.
<u>Plat:</u>	A plan or map of a plot of ground.
<u>Platform:</u>	Station area adjacent to tracks where trains stop to allow passengers to board and alight.



<u>Portal:</u>	In regard to OCS, see Portal Structure.
<u>Portal Structure:</u>	An OCS structure consisting of a crossbeam or truss supported by two separate OCS poles usually placed to the outside of multiple tracks to support OCS conductors. OCS support brackets or drop pipes are attached to the beam or truss to support the OCS cantilever frames.
<u>Positive Train Control (PTC):</u>	FRA-mandated train control requirement that automatically enforces train separation, collision avoidance, speed restrictions, and movement authority. On CHST ATP fulfills this requirement.
<u>Potentially Hazardous Fault:</u>	Fault having known or documented Holocene activity or known Quarterly faults with suspected Holocene activity.
<u>Pothole / Test Pit:</u>	An excavation to expose an underground facility.
<u>Power Operations Controller (POC):</u>	The authorized person in a Control Center who is permitted to operate and control TES equipment through the SCADA system and by voice commands to authorized field personnel and emergency response personnel, as applicable.
<u>Power Transformer:</u>	A device which transforms power on in ac system from one voltage level to another (e.g., from 115 kV to 25 kV).
<u>Prepared Subgrade:</u>	The upper layer of the subgrade is formed into a prepared subgrade layer, which normally has a cross slope. This layer is made of imported or treated material depending of the quality of the upper part of embankment or the bottom of the excavation. Its quality and compactness shall be better than the material below. Its function is to minimize the deformation of the upper part of the embankment or the bottom of the excavation and to prevent water that has passed through the subballast layer from penetrating to the earthwork below.
<u>Pressure Comfort:</u>	Conditions where there is no passenger ear discomfort due to pressure change.
<u>Pressure Tightness Coefficient:</u>	Time in which the difference between internal and external pressures upon a stepwise pressure change decrease from 100 percent to approximately 38 percent of the initial pressure difference.
<u>Private Utility:</u>	Utility infrastructure owned by a private corporation or public or private entities. They may not be regulated by the public or government agency.
<u>Public Address and Customer Information Sign (PACIS) System:</u>	System which provides synchronized audio and visual information to passengers and Authority personnel using Public Address speakers and Visual Signs.
<u>Public Area:</u>	Station free areas and paid areas, accessible to the general public.
<u>Public Transportation:</u>	Shared passenger transportation service available for use by the general public. Public transportation modes include buses, ferries, trolley buses, and various forms of rail transit including light rail, people movers, and grade separated "rapid transit" (metro/subways/elevated). Intercity public transportation includes airlines, buses, and intercity rail.



<u>Public Utility:</u>	Utility infrastructure that are operated and maintained for public service. Public Utilities can be either publicly or privately owned and involve natural monopolies in sectors specially regulated by the California Public Utilities Commission.
Q	
<u>Qualified Analyst:</u>	In regard to seismic design, an individual with the knowledge of engineering seismology and at least 5 years of experience in performing site-specific deterministic and probabilistic seismic hazard analyses (DSHA and PSHA) in California.
<u>Qualified Person:</u>	In regard to OCS and TES equipment, an authorized person who has been trained in and has demonstrated adequate knowledge of the installation, construction, maintenance, and operation of the OCS lines and TES equipment and the hazards involved, including identification of and exposure to electric supply and communications lines and equipment in or near the workplace.
<u>Quality Level:</u>	A level of accuracy scale used for identifying the location of underground and above ground utility facility information needed to develop capital projects, and for acquiring and managing that level of information during the project development process. Four Levels of Quality Measurement are used ranging from Level A to Level D.
<u>Quaternary Fault:</u>	Fault with evidence of movement in the past 1.6 million years.
<u>Queuing Area:</u>	Station area where passengers wait or line up to use a device or circulation element such as a ticket machine, fare gate, stair, elevator, or escalator. Queuing areas should be designed to accommodate waiting passengers without disrupting other passenger flows. Also, area provided to accommodate peak passenger surges.
R	
<u>Radio Frequency:</u>	The frequency range of the electromagnetic spectrum that is used for radio communication.
<u>Radio System:</u>	Communications systems which use radio propagation to transport voice and data between fixed entities and systems and mobile entities and systems.
<u>Rail Shared Corridor:</u>	See Shared Rail Corridor.
<u>Rail Return:</u>	The combination of track structure, jumpers, impedance bonds, grounds, and cables, each of which provides part of the electrical return path from the wheel-sets of the traction units to a substation.
<u>Rail Potential:</u>	The voltage between running rails and ground occurring both under operating conditions when the running rails are utilized for carrying the traction return current or under fault conditions.
<u>Redundant Utility Supply Circuits:</u>	A configuration of two supply circuits from the utility supply company that originate from different transformers or bus systems. Using redundant supplies will minimize the possibility that power to both circuits will be lost simultaneously.



<u>Refuge Track:</u>	A dead end track, normally connected to a station track, primarily for the purpose of temporary storage of a disabled train.
<u>Regional Control Center (RCC):</u>	See Control Center.
<u>Regenerated Power:</u>	Electrical power generated by electric vehicles when they brake by using their electric motors as electric generators.
<u>Regulation:</u>	A rule and administrative code issued by governmental agencies at all levels – federal, state, county, and municipal that impose specific requirements and at times mandate permits or approvals by the agency (generally to ensure health and safety of the public). Although regulations are not laws, they have the force of law as they are adopted under authority granted by statutes.
<u>Relocations:</u>	The removal, rearrangement, and reinstallation of a utility facility required by a transportation improvement project.
<u>Response Spectrum:</u>	The response of damped single degree of freedom oscillators to an earthquake time history.
<u>Restricted Area:</u>	An area for which a railroad agency has responsibility and to which access is permitted only to authorized persons.
<u>Restricted Manual Mode:</u>	A mode of operation, enforced by the ATC system, which allows trains to proceed under the manual control of the locomotive engineer when there is an ATC malfunction. Permission to enter Restricted Manual mode must be granted by the train dispatcher. Movement must be at Restricted Speed subject to the prescribed operating rules and procedures.
<u>Restricted Speed:</u>	A speed, not exceeding 20 mph, at which it is possible to stop within one half the range of vision, short of the next signal, another train, obstruction, or derail, while looking out for broken rail or switch not properly lined.
<u>Retained Cut:</u>	Trackway section where tracks are placed uncovered, below existing ground level and where adjacent soil is supported with retaining walls above top of rail elevation.
<u>Retained Fill:</u>	Trackway section where tracks are placed on embankment material contained by retaining walls above existing ground.
<u>Return Circuit (Return System):</u>	See Traction Power Return System.
<u>Reverse Curve:</u>	Section of the horizontal alignment of the trackway in which a curve to the left or right is followed immediately by a curve in the opposite direction.
<u>Richter Scale:</u>	A logarithmic scale measuring the severity of earthquakes, based on the magnitude of ground motion.
<u>Ridership:</u>	Number of passengers using CHST system over a certain period of time.



<u>Right-of-Way:</u>	A legal right of passage over a defined area of real property used for highway, railway, public utility services, or other purposes. In transportation usage, refers to the corridor along a roadway or track alignment that is controlled by a transit or transportation agency/authority and is usually the access control line.
<u>Risk:</u>	In the consideration of hazards and vulnerabilities, a measure of the combined probability and severity of potential harm to one or more resources as a consequence of exposure to one or more hazards.
<u>Rolling Stock:</u>	Wheeled railway vehicles.
<u>Rules:</u>	Operating requirements found in the Code of Operating Rules, Special Instructions or other authorized CHST system publications.
S	
<u>Safe Braking:</u>	A set of design provisions and procedures which together ensure that a train's ATP stopping distance is safe in normal conditions and in all likely combinations of adverse factors and failure conditions.
<u>Safe Point Intercom (SPI):</u>	Intercom stations targeted for passengers to report emergencies only and have a single button to actuate this function. Part of the TIS.
<u>Safety:</u>	The control of recognized hazards to achieve an acceptable level of risk.
<u>Scale:</u>	A graduated line representing a proportionate size.
<u>Sealing Characteristics:</u>	The capacity of the train to limit inside pressure change within given limits.
<u>Section Insulator:</u>	A mechanical sectionalizing device installed in the overhead catenary providing electrical separation between two adjacent catenary sub-sections both energized by the same traction power supply source which permits the passage of pantographs under power from one energized electrical sub-section to the next.
<u>Security:</u>	A means, active or passive, that serves to protect and preserve an environment and allows for the conduct of activities within an organization or society without disruption.
<u>Seismic Hazards:</u>	Earthquake-induced conditions such as vibratory ground motion, liquefaction, lateral spreading, dynamic compaction, seismically-induced slope failures, and ground rupture.
<u>Seismic Source Model:</u>	The geographic distribution of potential seismic sources that could affect the seismic ground motion at a particular site.
<u>Service:</u>	The portion of the electric, gas, water, sewer, or communication system that connects a customer, usually at the meter location, to the utility distribution or supply system.
<u>Side Platforms:</u>	Station area adjacent to a single track for the purpose of passenger boarding and alighting.



<u>Shared Corridor:</u>	A portion of high-speed rail alignment where the high-speed trains operate on their own dedicated tracks parallel to and in the vicinity of other transportation systems such as highways, passenger railroads, or freight railroads.
<u>Shared Rail Corridor:</u>	A type of Shared Corridor in which the other transportation systems are other railroads which may include passengers and freight.
<u>Shared Track:</u>	A track designated in the operating rules for the operation of both the high-speed trains and other passenger or freight trains. Shared Track shall have time separation between the hours of operation of the passenger or freight trains and the high-speed trains (temporal separation). Sometimes referred to as Shared Use Track.
<u>Shop Track:</u>	A designated track in a yard facility used for the maintenance or repair of rolling stock which is under the exclusive control of the Rolling Stock Maintenance employee in charge.
<u>Signal Aspect:</u>	See Aspect.
<u>Signal Block:</u>	See Block.
<u>Signal Indication:</u>	See Indication.
<u>Site Effects/Site Class:</u>	The effect of the subsurface soil/rock profile on the seismic ground motion and as classified in the CBC.
<u>Sleeve:</u>	A pipe in which a pipeline or conduit is inserted. Also, called casing.
<u>Slope Failures:</u>	Mapped or otherwise known slope failures such as rock falls, mud flows, debris flows, landslides, and other forms of slope failures.
<u>Slope Stability:</u>	The ability of slopes to resist movement.
<u>Slope Value:</u>	Slopes are defined as a fraction indicating the number of units of horizontal length required to achieve 1 unit of vertical distance, i.e., 2H:1V means the slope raises 1 unit vertically for 2 units of horizontal length.
<u>Sound Powered Telephone (SPT):</u>	A telephone system requiring no power, used for first responders in tunnels. Part of the TIS.
<u>Span Length:</u>	In regard to OCS, the distance between two consecutive OCS support points.
<u>Spiral:</u>	Curve of variable radius used to connect a straight section of track with the radius of the body of the curve. Sometimes called a Transition or a Transition Spiral.
<u>Stagger:</u>	Offset of the contact wire from the projected or super-elevated track centerline at each registration point that causes the contact wire to sweep side to side over the pantograph head during vehicle operation and which helps to distribute wear over the pantograph carbon collector strips.



<u>Standard:</u>	Uniform criteria, methods, processes and practices developed by a regulatory body, agency, industry association, or organizations such as trade unions and trade associations, or other professional affiliations, that represent accepted requirement or a benchmark to measure against.
<u>Static Contact Force:</u>	The mean vertical force exerted upward by the collector head on the overhead contact line, and caused by the pantograph-raising device, while the pantograph is raised and the vehicle is at standstill. See also Contact Force.
<u>Static Gauge:</u>	The maximum outline to which a vehicle may be fabricated. It will include only manufacturing tolerances.
<u>Static Wire:</u>	A wire, usually installed aerially adjacent to or above the catenary conductors and negative feeders, that connects OCS supports collectively to ground or to the grounded running rails to protect people and installations in case of an electrical fault. In an ac electrification system, the Static Wire forms part of the traction power return circuit and is connected to the running rails at periodic intervals and to the traction power facility ground grids. If mounted aerially, the static wire may also be used to protect the OCS against lightning strikes. Sometimes termed Aerial Ground Wire.
<u>Station:</u>	Areas within a station building envelope. Also, a place designated by name on the station pages of the current Timetable.
<u>Station Intercom:</u>	Intercoms which allow the station attendant to communicate with passengers at fare collection equipment, fare-barrier equipment, or through protective glass. Part of the TIS.
<u>Station Track / Platform Track:</u>	A track for the purpose of bringing a train alongside a station platform for a stop to embark / disembark passengers.
<u>Steady Arm:</u>	A lightly loaded registration arm that serves to hold or steady the contact wire at its correct lateral displacement/stagger.
<u>Step Voltage:</u>	The difference in surface potential experienced by a person bridging a distance of 1 m (3'- 3") with the feet without contacting any ground object.
<u>Structure Gauge:</u>	The outline defining the minimum distance from track centerline to various features.
<u>Stub End:</u>	A track that terminates at one end.
<u>Subballast Layer:</u>	An intermediate layer situated between the ballast and the subgrade layers. It protects the top of the embankment against erosion, ensures a better distribution of loads, and provides a leveled surface suitable for track laying. Subballast is made up of full crushed graduate gravel. This layer is referred to as the Blanket Layer in the UIC standards.
<u>Subgrade:</u>	The top layer of earthwork upon which the subballast layer rests. On an embankment, the subgrade will be formed of imported soil, whereas in a cut, it will be the naturally occurring soil.
<u>Subsidence:</u>	The gradual downward settlement or sinking of the ground surface.



<u>Subsoil:</u>	Soil of natural ground below subgrade.
<u>Substation (SS):</u>	An electrical installation where power is received at high voltage and transformed to the voltage and characteristics required at the catenary and negative feeders for the nominal 2x25 kV system, containing equipment such as transformers, circuit breakers and sectionalizing switches. It also includes the incoming HV lines from the power supply utility.
<u>Subsystem:</u>	<p>A grouping of items satisfying a logical group of functions within a particular system.</p> <p>An element of a system that, in itself may constitute a system.</p> <p>In regard to HST, refers to the major operational part of the high-speed rail system, i.e. infrastructure, rolling stock, train control, electrification, operations, and maintenance.</p>
<u>Superelevation:</u>	The difference in elevation between the outside rail of the curve and the inside rail of the curve measured between the highest point on each rail head. Normally called Cant in European publications.
<u>Supervisory Control and Data Acquisition (SCADA) System:</u>	System which provides centralized control and monitoring of multiple CHST systems.
<u>Switching Station (SWS):</u>	An installation at which electrical energy can be supplied to an adjacent, but normally separated electrical section during contingency power supply conditions. It also acts as a PS.
<u>Switch (Turnout):</u>	<p>The component of a Turnout consisting of switch rails and connecting parts providing a means for making a path over which to transfer rolling stock from one track to another.</p> <ul style="list-style-type: none"><li>• Split Switch: Synonymous with Switch on modern railroads.</li><li>• Secant Point Switch: A switch point in which the arc of the radius of the switch rail or the turnout itself crosses the gauge line of the stock rail. American standard switch rails are Secant Point Switches.</li><li>• Tangent Point Switch: A switch point in which the arc of the radius of the switch rail or the turnout itself matches the gauge line of the stock rail. European and most other turnouts are designed to be Tangent Point Switches.</li></ul>
<u>System:</u>	Grouping of items satisfying a logical group of functions.
<u>System Height:</u>	The vertical distance between the messenger and contact wires, at the support structure. Also known as System Depth
<u>System Safety Engineering:</u>	An engineering discipline that employs specialized professional knowledge and skills in applying scientific and engineering principles, criteria, and techniques to identify and eliminate hazards, in order to reduce the associated mishap risk.



## T

<u>Telephone and Intercom System (TIS):</u>	The system which provides mission critical voice communication functions for Authority personnel, Authority police personnel, third party emergency responders, and passengers.
<u>Tension Length:</u>	Length of a catenary section between its two termination points. Also known as Tension Section
<u>Tensioning Device:</u>	An assembly, typically placed at each end of a tension length, which comprises a balance weight arrangement that is used to maintain near-constant mechanical tension in one or more conductors of an auto-tensioned catenary.
<u>Terminal Control Facility (TCF):</u>	A control center located at terminal stations that will have immediate supervisory oversight over train and passenger operations within each specific terminal. TCF personnel will ensure that appropriate information is relayed to passengers either automatically or manually, and directly manage the station facility and operations on a local level. Actual dispatching of trains will be controlled by mainline dispatchers at the OCC or RCCs who will interface closely with TCF personnel.
<u>Terminal Station:</u>	The first or last station of a passenger rail route.
<u>Terminal Storage and Maintenance Facility (TSMF):</u>	A yard facility located near a terminal that provides overnight and mid-day rolling stock storage and Level 1 to 3 maintenance capabilities.
<u>Ties or Sleepers:</u>	Beams placed horizontally and laid perpendicularly to the rail to hold the rails to gauge, distribute the load of the track and equipment to the underlying support, and hold the track in horizontal and vertical alignment. Ties are normally between 8 feet and 8.5 feet long, except those supporting turnouts may be up to 16 feet long. The material normally used in CHSR track will be concrete, but ties may be of wood in yard turnouts and certain other special cases.
<u>Time History:</u>	The values of acceleration, velocity, or displacement with time for an earthquake.
<u>Top of Rail:</u>	Refers to the top of the rail on the track which defines the profile elevations of the track. On curves with superelevation, it is the top of the inside rail, also commonly called the top of low rail.
<u>Topographic Map:</u>	A map of the features of the surface of the earth considered collectively as to form.
<u>Touch Voltage:</u>	The potential difference between the ground potential rise (GPR) and the surface potential at the point where a person is standing while at the same time having a hand in contact with a grounded structure (Per IEEE-80).
<u>Track Bed Layers:</u>	General term that includes the material imported for the foundation of the track. It includes the ballast and the following elements when present: <ul style="list-style-type: none"><li>• Subballast layer</li><li>• Prepared subgrade</li><li>• Geosynthetics</li></ul>



<u>Track Centerline:</u>	The line equidistant between the inside faces of the rail heads of a track.
<u>Track Centers:</u>	Distance between adjacent track centerlines.
<u>Track Circuit:</u>	A method of determining occupancy of a section of track and/or a broken rail by sending an electrical signal down the track from the transmit end to the receive end of the section of track, which indicates that the section of track is complete and not occupied by a train by detecting a minimum level of the proper signal at the receive end.
<u>Track Formation Level:</u>	Surface intended to receive the track bed layers.
<u>Track Foundation:</u>	Constitutes ballast, blanket, and subgrade which is placed/exists below track structure to transmit load to subsoil.
<u>Track Gauge:</u>	Distance between the inner side of the rail heads.
<u>Traction Electrification System (TES):</u>	The combination of the traction power supply system (TPS) and the OCS together with the traction power return system, a SCADA system, which forms a fully functional system, and which provides the electrical energy to the electrically powered vehicles on the CHST railway line.
<u>Traction Power Facilities (TPF):</u>	A general term that encompasses substations, switching stations, and paralleling stations.
<u>Traction Power Return System:</u>	<p>All conductors, including the grounding system for the electrified railway tracks, which form the intended path for the traction return current from the wheel-sets of the traction units to the substations under normal operating conditions and the total current under fault conditions. The conductors may be of the following types:</p> <ul style="list-style-type: none"><li>• running rails</li><li>• impedance bonds</li><li>• static wires, and buried ground or return conductors</li><li>• rail and track bonds</li><li>• return cables, including all return circuit bonding and grounding interconnections</li><li>• earth</li></ul> <p>and, as a consequence of the configuration of the autotransformer connections, the negative feeders.</p>
<u>Traction Power Supply System (TPS):</u>	<p>The railway electrical distribution network used to provide energy to high-speed electric trains, which comprises three types of traction power facilities in addition to connections to the OCS and the Traction Power Return System:</p> <ol style="list-style-type: none"><li>1. Substations (SS),</li><li>2. Switching Stations (SWS), and</li><li>3. Paralleling Stations (PS).</li></ol>
<u>Traffic Locking:</u>	The enforcement of a single direction of operation in a track section.



<u>Train Control and Communications Room (TCCR):</u>	An equipment room that houses all electronics, power, and networking necessary for the Train Control and communications functions.
<u>Train Operator's Display:</u>	An indication in the Train Operator's cab that provides the status of the ATC system and the safe limits within which the train may operate
<u>Trainset:</u>	A minimum set of rolling stock that can operate in service.
<u>Transition Rate (with distance):</u>	The rate at which superelevation or unbalanced superelevation is placed in track, usually stated as feet per inch, or a ratio.
<u>Transition Rate (with time):</u>	The rate at which superelevation or unbalanced superelevation is experienced with time at a defined speed. Units are normally seconds per inch.
<u>Transition Track:</u>	A designated track connecting the main track to a yard facility designed to allow trains to safely reduce from and accelerate to main track speed. ATC rules are in effect on transition tracks. Movements will be governed by speed displayed on the On-board Cab Display, unless the train is in ATC Bypass mode, in which case it will proceed at Restricted Speed.
<u>Transportation Demand Management:</u>	The operation and coordination of various transportation system policies and programs to manage travel demand to make the most efficient and effective use of existing transportation services and facilities.
<u>Transportation System Management:</u>	Actions that improve the operation and coordination transportation services and facilities to realize the most efficient use of the existing transportation system.
<u>Transverse:</u>	A facility passing from one side of the right-of-way to the other side of the right-of-way.
<u>Travel Time:</u>	The time spent on a train from a place of origin to a place of destination.
<u>Trolley Wire:</u>	Alternative term for contact wire used for single wire OCS. See Contact Wire.
<u>Tsunamis:</u>	Waves that travel in the open ocean and are caused by an undersea earthquake, landslide, or volcanic activity.
<u>Turnout:</u>	Mechanical installation enabling trains to be guided from one track to another.
U	
<u>Unbalance, Unbalanced Superelevation:</u>	The difference between the Superelevation and Equilibrium Superelevation. In European publications, Unbalance is called Cant Deficiency (if the actual Superelevation is less than the Equilibrium Superelevation) and Excess Cant (if the actual Superelevation is greater than the Equilibrium Superelevation).
<u>Unbalanced Loads:</u>	Loads applied by a 3 phase transmission line that do not have the same load current across each of the 3 phases.



<u>Uninsulated Overlap (or Mechanical Overlap):</u>	A length of the overhead contact system where the contact and messenger wires of two adjoining tension sections overlap before terminating at opposite ends of the overlap section. The two catenaries are jumpered together, thus allowing pantographs under power to transition from one tension length to the next.
<u>Uplift:</u>	The vertical distance by which the overhead contact system is raised during the passage of a pantograph.
<u>Upper Part of Embankment:</u>	Top three feet of an embankment. It requires high quality design and construction in order to ensure the appropriate bearing-capacity to receive track bed layers.
<u>Unstable Formation:</u>	It is yielding formation with non-terminating settlement including slope failure, which requires excessive maintenance efforts.
V	
<u>Variable Rate Spiral:</u>	See half-sine spiral.
<u>Variance:</u>	Approved deviation, or exception, from a Minimum design criteria or Minimum design standard.
<u>Vertical Curve:</u>	Transition between grades. Normally parabolic in US and Asian practices and circular arc radii in European practices.
<u>Virtual Transition:</u>	An imaginary transition imputed as being of the length of the truck centers (TC) of the passenger carrying vehicle operated into the curve or turnout.
<u>Virtual Transition Rate:</u>	The transition rate with time into a curve or turnout with no actual transition, or a transition only to a larger radius, not to infinity.
<u>Vital:</u>	A subsystem, element, component, or functional requirement in a safety critical system that is required to be implemented in a fail-safe manner.
<u>Volcanic:</u>	Mapped or otherwise known volcanic centers and/or hydrothermal activity associated with volcanic activity.
W	
<u>Watershed:</u>	The area that contributes water to a drainage system or stream.
<u>Wayside Drainage:</u>	Drainage system (enclosed pipes, ditches, precast channel) laid to collect and discharge surface water, seepage water, and ground water.
<u>Wayside Facilities:</u>	Facilities in close proximity to the trackway. It is inclusive of traction power, communications, and train control facilities and exclusive of tracks.
<u>Wayside Power:</u>	Electrical power provided from the utility grid to the electrified railroad right-of-way at convenient locations from the side of the rail tracks or corridor. Where utility feeds are not available, wayside power can be supplied by tapping the 25 kV ac parallel negative feeders with appropriate transformation.



<u>Wayside Power Control Cubicle (WPC):</u>	An enclosure for power supply equipment for operation of motorized disconnect switches and the associated SCADA equipment located at the wayside.
<u>Wayside Signals:</u>	Devices located along the right-of-way for providing information to the locomotive engineers relative to train operations as opposed to the cab signal displays that are located within the control compartment of the rolling stock.
<u>Wide Area Network (WAN):</u>	Network which consists of the hardware and software required to switch, manage, process, control, monitor, and delivery data traffic between field locations and central control facilities via the fiber optic and copper cable infrastructure. The WAN's purpose is to deliver system data between any points on the wired network in a secure and reliable fashion.
<u>Wireless Local Area Network (WLAN):</u>	WLAN based on the IEEE 802.11 standards. Also known as WiFi.
Y	
<u>Yard:</u>	Inclusive of: <ol style="list-style-type: none"><li>1. Rolling stock yard where revenue service vehicles are stored and maintained.</li><li>2. MOI yard which supports maintenance of trackwork, structures, and other facilities.</li></ol>
<u>Yard Control Center (YCC):</u>	See Control Center.
<u>Yard Limits:</u>	The tracks governed by the YCC at a yard facility.
<u>Yardmaster:</u>	The employee responsible for ensuring the coordination and availability of the rolling stock fleet to meet daily service requirements and who has overall responsibility for all activities in the yard facility
<u>Yard Mode:</u>	A mode of operation within yard limits which allows trains to proceed under the manual control of the locomotive engineer at Restricted Speed not exceeding 15 mph. Speed and yard signal compliance will be automatically enforced.
<u>Yard Signal:</u>	A fixed signal within the designated limits of a yard facility that displays either a red or yellow aspect and governs movements within the limits of the yard facility. A yellow aspect indicates that a route is set and locked, and that the section of track between opposing yard signals within which the switches are located is unoccupied.
<u>Yard Signal System:</u>	A means of train control wherein trains are operated in Yard Mode under the control of the locomotive engineer, subject to yard signal indications, speed restrictions and special instructions.
<u>Yard Speed:</u>	Restricted Speed not exceeding 15 mph, within yard limits.



Yard Track: A section of track used for storage of trains that is auxiliary to the main track and not used by trains that are carrying passengers. Refuge tracks at stations are yard tracks. Yards consist of more than one yard track used for storing trains, inspecting trains, and accessing maintenance facilities. Yard tracks may or may not have track circuits on them.

Yoke Plate: A plate or casting typically proportioned to accommodate unequal tensions in two or more wires or cables that are terminated on one side and which are balanced by a single terminating cable on the other side, permitting the use of only one balance weight arrangement for multiple catenary conductors.

### 6.1.2 Abbreviations and Acronyms

The following list is a combination of the abbreviations and acronyms identified thus far for design of the CHST system. Several acronyms have different definitions depending on the technical area in which they are used.

For additional abbreviations and acronyms, refer to the Facilities Naming Convention – Notice to Designers. Items in the Facilities Naming Convention include Subdivisions, stations, grade separated structures, maintenance facilities, and designators for facilities such as traction power, power utility, train control, communications, and interlockings.

Note, abbreviations such as those for alternating current and direct current are properly lower case except when they are used in a title or at the beginning of a sentence.

A	
A	Ampere
AACE	Association for the Advancement of Cost Engineering
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
AC/ac	Alternating Current
AC&ID	Access Control and Intrusion Detection
ACE	Altamont Commuter Express
ACI	American Concrete Institute
ACS	Access Control System
ACSR	Aluminum Conductor Steel Reinforced
ADA	Americans with Disabilities Act (Federal)
ADAAG	ADA Accessibility Guidelines for Buildings and Facilities
AEG	Association of Environmental and Engineering Geologists
AGI	American Geological Institute
AHJ	Authority Having Jurisdiction
AHP	Air Horsepower
AISC	American Institute of Steel Construction
AMCA	Air Movement and Control Association, Inc.
ANSI	American National Standards Institute
ANSS	Advanced National Seismic System
APEFZ	Alquist-Priolo Earthquake Fault Zone
API	Application Programming Interface
APN	Assessor's Parcel Number
APS	Advance Planning Study
APTA	American Public Transportation Association
AREMA	American Railway Engineering and Maintenance-of-Way Association
AS	Aerial Structure
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASPRS	American Society for Photogrammetry and Remote Sensing
ASTM	ASTM International (formerly American Society for Testing and Materials)
AT	Autotransformer



ATC	Applied Technology Council
ATC	Automatic Train Control
ATCM	Airborne Toxic Control Measure
ATEL	Administrative Telephone
ATO	Automatic Train Operation
ATP	Automatic Train Protection
ATS	Automatic Train Supervision
Authority	California High-Speed Rail Authority
AVL	Automatic Vehicle Location
AWS	American Welding Society
<b>B</b>	
BART	Bay Area Rapid Transit
BC	Backbone Cabling
BDA	Bi-Directional Amplifier
BFE	Base Flood Elevation
BGG	Board of Geologists and Geophysicists
BHP	Brake Horsepower
BICSI	Building Industry Consulting Service International
BMP	Best Management Practice
BNSF	BNSF Railway (formerly known as Burlington Northern Santa Fe Railway)
BPT	Becker Hammer Penetration Test
BR	Bridge
BRS	Broadband Radio System
BRT	Bus Rapid Transit
BS	British Standard (published by British Standards Institution)
BSC	Base Station Controller
BSI	British Standards Institution
BSO	Basic Safety Objective
BTS	Base Transceiver Station
BTU	British Thermal Unit
<b>C</b>	
C	Amplification Factor on $\Delta_D$ for ESA and RSA
C&C	Command and Control
C&S	Communications and Signals
CADD	Computer-Aided Design and Drafting
CAHSRA	<i>Not Used; may use Authority to refer to the California High-Speed Rail Authority</i>
CAI	Customer Assistance Intercom
CalDAG	California Disabled Accessibility Handbook
CALNET	California Integrated Telecommunications Network
Caltrain	Commuter rail operated by the Peninsula Corridor Joint Power Board
Caltrans	California Department of Transportation
CARB	California Air Resources Board



CAT	Category
CAT	Category Specification for Twisted Pair Cabling
CBC	California Building Code
CBDA	California Department of Transportation - Bridge Design Aid Manual
CBDD	California Department of Transportation - Bridge Design Details Manual
CBDM	California Department of Transportation - Bridge Design Manual
CBDS	California Department of Transportation - Bridge Design Specifications
CBPD	California Department of Transportation - Bridge Design Practice Manual
CBR	California Bearing Ratio
CBSC	California Building Standards Code
CBTC	Communications-Based Train Control
CCB	Change Control Board
CCEM	Capital Cost Estimating Methodology
CCJPA	Capitol Corridor Joint Powers Authority
CCR	California Code of Regulations
CCS	California Coordinate System
CCTV	Closed Circuit Television
CDC	CHST Design Criteria
CDE	California Department of Education
CEG	Certified Engineering Geologist
CEN	European Committee for Standardization (Comité Européen de Normalisation)
CENELEC	European Committee for Electrotechnical Standardization (Comité Européen de Normalisation Electrotechnique)
CEQA	California Environmental Quality Act
CES	Customer Emergency Stations
CF	Centrifugal Force
CFD	Computational Fluid Dynamics
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CGS	California Geological Survey
CHSRA	<i>Not Used; may use Authority to refer to California High-Speed Rail Authority</i>
CHST	California High-Speed Train
CHSTP	California High-Speed Train Project
CI	Cable Infrastructure
CIC	Communications Interface Cabinet
CIDH	Cast-in-Drilled-Hole
CIM	Customer Information Monitor
C-I-P	Cast-in-Place
CIS	Customer Information Sign
CISS	Cast-in-Steel-Shell
CL	Collision Loads
CL-PS	Connection-Less Packet-Switched
CMAS	Commercial Mobile Alert System
CMRR	Common Mode Rejection Ratio



CMTD	Caltrans Bridge Memorandum to Designers Manual
CO-CS	Connection-Oriented Circuit-Switched
CO-PS	Connection-Oriented Packet-Switched
Comm	Communications
COTS	Commercial Off-the-Shelf
CPT	Cone Penetration Test
CPT <sub>μ</sub>	Cone Penetration Test with pore water pressure measurement
CPTED	Crime Prevention Through Environmental Design
CPU	Central Processing Unit
CPUC	California Public Utilities Commission
CQC	Complete Quadratic Combination
CR	Creep Effects
CROW	Caltrans Right of Way
CSDC	Caltrans Seismic Design Criteria
CSH	Effects from creep and shrinkage of concrete
CTRL	Channel Tunnel Rail Link
Cu	Copper
CW	Contact Wire
CWR	Continuously Welded Rail
D	
D	Dead Load
DAQ	Delivered Audio Quality
DARC	District Airspace Review Committee
DAS	Distributed Antenna System
dB	Decibel
DB/ D-B	Design-build
DB	Deutsche Bahn (German Railway)
dBuV	Decibel Microvolts
dBuV/m/MH	Decibel Microvolts per Meter per Megahertz
DC/dc	Direct Current
DC	Dead load of structural components and permanent attachments
DCS	Data Communications Subsystem
DD	Device Driver
DD	Downdrag Force
DE	Design Earthquake
DEIR	Draft Environmental Impact Report (CEQA)
DEIS	Draft Environmental Impact Statement (NEPA)
DGN	MicroStation design file
DOD	Department of Defense (Federal)
DOD / DoD	Division of Design (Caltrans HQ)
DoPM	Caltrans Division of Project Management
DOT	Department of Transportation (Federal)
DPM	Design Project Manager



DR	Derailment Loads from High-Speed Trains
DSA	Division of State Architect, Department of General Services
DSC	Differing Site Conditions
DSHA	Deterministic Seismic Hazard Analysis
DTM	Digital Terrain Model
DTX	Downtown Extension (Caltrain)
DVR	Digital Video Recorders
DW	Dead Load Of Architectural Finishes, Wearing Surfaces And Utilities
E	
E	Earthquake Demands
E <sub>L</sub>	Longitudinal Earthquake Demands
E <sub>T</sub>	Transverse Earthquake Demands
EC	European Community
ECS	Environmental Control Systems
ED	Dynamic Earth Pressures
EEWDS	Earthquake Early Warning System
EF	Entrance Facility
EH	Lateral Static Earth Pressure
EI	Emergency Intercom
EIA	Electronic Industries Alliance
EIPB	Excellence in Public Buildings (State)
EIR	Environmental Impact Report (CEQA)
EIRENE	European Integrated Radio Enhanced Network
EIS	Environmental Impact Statement (NEPA)
EL	Locked-In Construction Forces
EM	Engineering Manager
EMC	Electromagnetic Compatibility
EMCP	EMC Program Plan
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
EMS	Element Management System
EMT	Engineering Management Team
EMT	Electrical Metal Conduits
EMU	Electric Multiple Unit
EMWIN	Emergency Managers Weather Information Network
EN	European Standard (EuroNorm)
ENE	Technical Specification for Interoperability of the Trans-European High-Speed Rail System – Energy Subsystem
ENR	Engineering News Record
EPA	Environmental Protection Agency (Federal)
EPB	Earth Pressure Balanced



ERTMS	European Rail Traffic Management System
ES	Surcharge loads
ESA	Equivalent Static Analysis
ESNIA	End-System to Network Interface (Air)
ESNIW	ESNIW End-System to Network Interface (Wired)
ETCS	European Train Control System
ETEL	Emergency Telephone
ETS	Emergency Trip System
ETSI	European Telecommunications Standards Institute
EU	European Union
EV	Vertical earth pressure
EVACS	Emergency Voice Communication System
F	
$F_u$	Elastic Force Demands including OBE events
FAA	Federal Aviation Administration
FACP	Fire Alarm Control Panel
FAS	Fire Alarm System
FBE	Functional Basis Earthquake
FC	Fare Collection
FCC	Federal Communications Commission
FCC	Fire Control Center
FDP	Fiber Distribution Panel
FEE	Functional Evaluation Earthquake
FEMA	Federal Emergency Management Agency
FER	Fault Evaluation Report
FFT	Fast Fourier Transform
FHC	Fire Hose Cabinets
FHRR	Fire Heat Release Rate
FHWA	Federal Highway Administration
FHZ	Fault Hazard Zone
FIRM	Flood Insurance Rate Maps
FLSS	Fire/Life Safety and Security
FOC	Fiber Optic Cable
FOS	Factor of Safety
FPL	Functional Performance Level
fpm	Feet Per Minute
fps	Feet Per Second
FR	Frictional Force
FRA	Federal Railroad Administration
FRIS	Final Relocation Impact Study/Statement
FSTIP	Federal Statewide Transportation Improvement Program
ft	Feet or foot
FTA	Federal Transit Administration



FTIP	Federal Transportation Improvement Program
G	
g	Standard gravity (32.2 ft/s <sup>2</sup> )
Gbps	Gigabits per second
GBR	Geotechnical Baseline Report
GBR-B	Geotechnical Baseline Report for Bidding
GBR-C	Geotechnical Baseline Report for Construction
GDR	Geotechnical Data Report
GE	California Registered Geotechnical Engineer
GETS	Government Emergency Telecommunications Service
GHz	Gigahertz
GigE	Giga-bit Ethernet
GIS	Geographic Information System
GMA	Ground Motion Analysis
GMPE	Ground Motion Prediction Equation
GNTS	GPS Network Timing System
GO	General Order
GPR	Ground Potential Rise
GPS	Global Positioning System
GSM	Global System for Mobile Communications
GSM-R	Global System for Mobile Communications – Railway
GTGM	Geotechnical Technical Guidance Manual (FHWA)
GUI	Graphical User Interface
H	
HC	Horizontal Cabling
HD	Hard Drawn
HDM	Highway Design Manual
HDPE	High Density Polyethylene
HDS	Hydraulic Design Series
HEC	Hydraulic Engineering Circular
Hi-Rail	Highway-Rail Vehicle
HMF	Heavy Maintenance Facility
HMI	Human Machine Interface
HOV	High-Occupancy Vehicle
Hp / hp	Horsepower
HPI	Help Point Intercom
hr	hour
HSR	High-Speed Rail
HST	High-Speed Train
HV	High Voltage
HVAC	Heating, Ventilation and Air Conditioning
Hz	Hertz



I	
I	Vertical Impact Effect
IA	Interagency Agreement
IBC	International Building Code
IC	Incident Commander
ICEA	Insulated Cable Engineers Association
ICES	International Committee on Electromagnetic Safety
ICP	Incident Command Post
ICS	Incident Command Center
ID	Internal Diameter
IDF	Intensity Duration Frequency
IDS	Intrusion Detection System
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
IG	Insulated Ground
IIMP	Integrated Information Management Platform
IJ	Insulated Joint
IMC	Intermediate Metal Conduit
IMP	Impedance Bond
IMV	Infrastructure Maintenance Vehicle
INF	Infrastructure Subsystem
Inwg	Inch watergauge
IR	Incident Room
ISEP	Implementation Stage EMC Plan
ISM Band	Industrial, Scientific and Medical Band
ISO	International Organization for Standardization
ISP	Inside Plant
ISRM	International Society for Rock Mechanics
ITU	International Telecommunication Union
J	
JARTS	Japan Railway Technical Service
JNR	Japanese National Railways
JPB	Joint Powers Board
JRTT	Japan Railway Construction, Transport and Technology Agency
K	
kHz	Kilohertz
kPa	Kilo Pascal
km/h	Kilometers per Hour
kV	Kilovolts
L	
LADWP	Los Angeles Department of Water and Power
LAN	Local Area Network



lb	Pound
LCCA	Life Cycle Cost Analysis
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LEED®	Leadership in Energy and Environmental Design
LF	Traction or Braking forces
LFMC	Liquid Tight Flexible Metal Conduit
LiDAR	Light Detection and Ranging
LL	Live Load
LLH	Highway Live Loads
LLHL	Earth Pressure Loads From Surcharge Due To Highway Traffic Loads
LLHR	Earth Pressure Loads From Surcharge Due To Railroad Loads
LLHT	Earth Pressure Loads From Future Live Loads
LLP	Roof, Floor, and Pedestrian Live Loads
LLRM	Modified Cooper E-50
LLRR	Maintenance And Construction Train Live Load
LLS	Live Load Surcharge
LLV	High-speed train live load
LOS	Level of Service
LOS	Line of Sight
LOSSAN	Los Angeles to San Diego Rail Corridor
LOTB	Logs of Test Borings
LRFD	Load and Resistance Factor Design
LRT	Light Rail Transit
LV	Low Voltage
M	
m	Meter
M (as prefix)	Mega-
$M_w$	Moment Magnitude Scale of Earthquake
MARTA	Metropolitan Atlanta Rapid Transit Authority
MAS	Maximum Authorized Speed
Mbps	Megabits per second
MCC	Maintenance Control Center
MCE	Maximum Considered Earthquake
METOC	Naval Meteorology and Oceanography
mG	Milligauss
Mg	Magnesium
MHz	Megahertz
MIL	Military
MLIT	Japanese Ministry of Land, Infrastructure and Transport
mm	Millimeter
MMF	Multimode Fiber
MMIS	Maintenance Management Information System



MMS	Maintenance Management System
MOA	Memorandum of Agreement
MOD	Motor Operated Disconnect Switch
MOI	Maintenance of Infrastructure
MORANE	Mobile Radio for Railway Networks in Europe
MOTC	Ministry of Transportation and Communication
MOU	Memorandum of Understanding
MPE	Maximum Permissible Exposure
MPE (Assessment)	Measurement Procedure for EIR/EIS Assessment of CHST Alignment EMI Footprint
MPH/mph	Miles per hour
MPLS	Multi-Protocol Label Switching
MRDS	Mineral Resources Database System
m/s	Meters per second
MSC	Mobile Switching Center
MSE	Mechanically Stabilized Earth
MSF	Maintenance and Storage Facility
mT	Millitesla
MTU	Master Terminal Unit
MVA	Megavolt Ampere
MW	Megawatt
MW	Messenger Wire
N	
NAD	North American Datum
NAVD	North American Vertical Datum
NCL	No Collapse Performance Level
NCS	National Communications System
NCTD	North County Transit District
NDP	Nonlinear Dynamic Procedure
NE	Nosing and hunting effects
NEBS	Network Equipment-Building System
NEC	National Electrical Code
NEHRP	National Earthquake Hazards Reduction Program
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act (Federal)
NESC	National Electrical Safety Code
NF	Negative Feeder
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NGA	Next Generation of Attenuation
NGO	Non-Governmental Organization
NGS	National Geodetic Survey
NHI	National Highway Institute



NHS	National Highway System
NIC	Not in Contract
NIST	National Institute of Standards and Technology
NMS	Network Management System
NNI <sub>LW</sub>	Network to Network Interface (LAN to WAN)
NNI <sub>WL</sub>	Network to Network Interface (RS to LAN)
NOA	Naturally Occurring Asbestos
NOD	Notice of Determination (CEQA)
NPDES	National Pollutant Discharge Elimination System
NPRM	Notice of Proposed Rule Making
NPSPAC	National Public Safety Planning Advisory Committee
NRCS	National Resource Conservation Service
NTCIP	National Transportation Communications for ITS Protocol
NTP	Notice to Proceed
O	
O&M	Operations and Maintenance
OBE	Operating Basis Earthquake
OCC	Operations Control Center
OCD	On-board Cab Display
OCS	Overhead Contact System
OET	Office of Engineering and Technology
OP	Overpass
OPL	Operability Performance Level
ORS	Operations Radio System
OSHA	Occupational Safety and Health Administration
OSI	Open Systems Interconnection
OSP	Outside Plant
P	
Pa	Pascal
PA	Public Address
PA&ED	Project Approval and Environmental Document
PACIS	Public Address and Customer Information Sign (System)
PCF	Pounds per cubic foot
PCJPB	Peninsula Corridor Joint Powers Board
PCPT	Piezocene Penetrometer Test
PDDM	Project Development and Design Manual (FHWA)
PDF, pdf	Portable Document File (an electronic file format)
PDPM	Project Development Procedures Manual (Caltrans)
PDS	Project Development Services
PDT	Project Development Team
PE	Professional Engineer
PEER	Permit Evaluation Engineering Report
PFDDHA	Probabilistic Fault Displacement Hazard Analysis



PG	Professional Geologist
PGA	Peak Ground Acceleration
PG&E	Pacific Gas & Electric Company
PGV	Peak Ground Velocity
PHA	Preliminary Hazard Analysis
PID	Project Initiation Document
PM	Project Manager
PMS	Power Management System
PMT	Program Management Team
POC	Power Operations Controller
POL	Platform Occupant Load
PR	Project Report
PS	Paralleling Station
PS	Public Safety
PS	Secondary Forces From Prestressing
PS&E	Plans, Specifications, and Estimate
PSB	Passenger Service Booth
PSF, psf	Pounds per square foot
PSHA	Probabilistic Seismic Hazard Analysis
psig	Pounds per Square Inch Gauge
PSR	Project Study Report
PSST	Public Safety Spectrum Trust
PSTN	Public Switched Telephone Network
PSTTRS	Public Safety Trench and Tunnel Radio System
PTC	Positive Train Control
PTEPP	Passenger Train Emergency Preparedness Plan
PUC	Public Utilities Commission (State)
PVC	Polyvinyl Chloride
Q	
QL	Quality Level
QoS	Quality of Service
R	
RAMS	Reliability, Availability, Maintainability and Safety
RC	Regional Consultant
RCC	Regional Control Center
RCP	Reinforced Concrete Pipe
RE	Regional Engineer
RE	Resident Engineer
RF	Radio Frequency
RFI	Radio Frequency Interference
RI	Return Interval
RM	Regional Manager
RM	Restricted Manual (Mode of Operation)



RMR	Rock Mass Rating
rms	root mean square
ROD	Record of Decision (NEPA)
ROW	Right-of-Way <sup>1</sup>
RPA	Rule of Particular Applicability
RPC	Regional Planning Committee
RR	Railroad
RS	Radio System
RS	Rolling Stock
RSM	Rolling Stock Maintenance
RSS	Reinforced Soil Slopes
RSTP	UMTA Radiated Suggested Test Procedures
RTU	Remote Terminal Unit
RTU/PLC	Remote Terminal Unit/Programmable Logic Controller
R/W	Right-of-Way <sup>2</sup>
S	
s	Second
SBD	Safe Braking Design
SCADA	Supervisory Control and Data Acquisition
SCC	Standard Cost Categories
SCE	Southern California Edison (Electric Company)
SCEC	Southern California Earthquake Center
SCR	Station Control Room
SCRRA	Southern California Regional Rail Authority
S/D	Span to Depth Ratio
SDC	Seismic Design Criteria
SDG&E	San Diego Gas & Electric Company
SE	Earth Settlement Effects
SEE	Safety Evaluation Earthquake
SEM	Sequential Excavation Method
SEPP	Security and Emergency Preparedness Plan
SER	Standard Environmental Reference
SES	Subway Environment Simulation
SF/sf	Square foot
SFP	Single Focal Points
SH	Shrinkage effects
SHA	Seismic Hazards Analysis
SHS	State Highway System
SIA	Swiss Standards for Construction
SMF	Single Mode Fiber

<sup>1</sup> Where prohibited by EIR/EIS guidelines, do not abbreviate right-of-way.

<sup>2</sup> Where prohibited by EIR/EIS guidelines, do not abbreviate right-of-way.



S-MPE	Section EMI Footprint Measurement Protocol
SMUD	Sacramento Municipal Utility District
SNCF	French National Railway Company (Société Nationale des Chemins de fer Français)
SOTR	Substance of the Rule
SP	Special Publication
SPI	Safe Point Intercom
SPL	Safety Performance Level
SPT	Sound Powered Telephone
SPT	Standard Penetration Test
SR	System Requirement
SRRA	Safety Roadside Rest Area
SRS	Signal Reference Structure
SRSS	Square Root of Sum of Squares
SS	Substation
SS	Slipstream effects
SSC	Safety and Security Certification
SSC	Seismic Source Characterization
SSI	Sensitive Security Information
SSI	Soil-Structure Interaction
SSMP	Safety and Security Management Plan
SSPP	System Safety Program Plan
SST	Traction Power Supply Station (with HV Utility Supply)
SSU	Synchronization Supply Unit
STI	Speech Transmission Index
STP	Shielded Twisted Pair Cable
STP	Suggested Test Procedure
SVRT	Silicon Valley Rapid Transit
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SWS	Switching Station
T	
TAP	Technical Advisory Panel
TBM	Tunnel Boring Machine
TC	Track Center
TC	Train Control
TCC	Train Control and Communications
TCCR	Train Control and Communications Room
TCF	Terminal Control Facility
TCL	Track Centerline
TCP/IP	Transmission Control Protocol/Internet Protocol
TCR	Transmission Communications Room



TD	Train Dispatcher
TDD	Telecommunications Device for the Deaf
TES	Traction Electrification System
TG	Gradient temperature effects
TGV	Train à Grande Vitesse
THSR	Taiwan High Speed Rail
THSRC	Taiwan High Speed Rail Corporation
THSRP	Taiwan High Speed Rail Project
TIA	Telecommunications Industry Association
TIN	Triangulated Irregular Network
TIS	Telephone and Intercom System
TM	Technical Memorandum
TOD	Transit Oriented Development
TP	Traction Power
TPF	Traction Power Facilities
TPS	Traction Power Supply System
<i>TPSS</i>	<i>Not used. Abbreviate Traction Power Substation as "SS"</i>
TRB	Transportation Research Board
TRC	Tunnel Radio Communications
TSI	Technical Specifications for Interoperability (European Union's)
TSMF	Terminal Storage and Maintenance Facility
TSP	Telecommunications Service Priority
TSSS	Total Station Survey System
TTB	Telephone Terminal Board
TU	Uniform temperature effects
TVA	Threat and Vulnerabilities Assessment
TVM	Ticket Vending Machine
U	
UCS	Unconfined Compressive Strength
UFC	Uniform Fire Code
UHF	Ultra High Frequency
UI	User Interface
UIC	International Union of Railways (Union Internationale des Chemins de Fer)
UL	Underwriters Laboratories
UMTA	Urban Mass Transportation Administration (now Federal Transit Administration)
UP	Underpass
UPRR	Union Pacific Railroad
UPS	Uninterruptible Power Supply
US / U.S.	United States
USCS	United Soil Classification System
USDOT	United States Department of Transportation
USGS	United States Geologic Survey (Federal)



UTP	Unshielded Twisted Pair
V	
V	Volts
V&V	Verification and Validation
VHF	Very High Frequency
VLAN	Virtual Private LAN
VOC	Volatile Organic Compounds
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network
VRCS	Voice Radio Communications System
VST	Vane Shear Test
VTA	Valley Transportation Authority (of Santa Clara County)
VVVF	Variable Voltage Variable Frequency
W	
WA	Water loads
WAD	Hydrodynamic force effect
WAN	Wide Area Network
WBS	Work Breakdown Structure
WL	Wind load on live load
WLAN	Wireless LAN
WMATA	Washington Metropolitan Area Transit Authority
WPC	Wayside Power Control Cubicles
WPS	Wireless Priority Service
WS	Wind load on structure
WS	Workstation
WSD	Working Stress Design
Y	
YCC	Yard Control Center
YDM	Yardmaster
YM	Yard Mode (Mode of Operation)

